Chemical Week

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CPI growth plans
threatened by
slipping rates
of returnp. 21

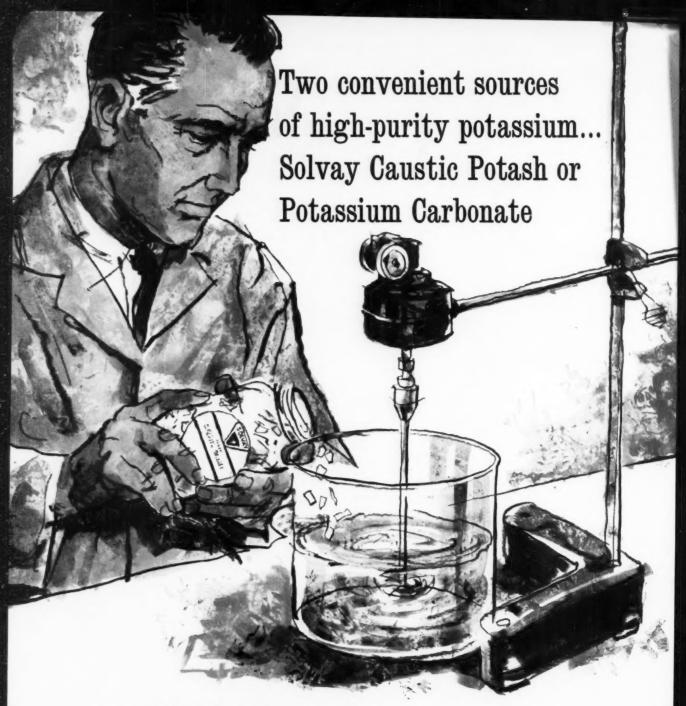
Packaging wrap-up.
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highlights fierce
film rivalryp. 27

Compacting equipment catches on, squeezes more profit out of fine powders . . p. 51

▼ TUNE IN ON
NEW TWIST
IN PLANT
PROMOTION ...p. 91

Going international?
Survey shows you don't have to be big

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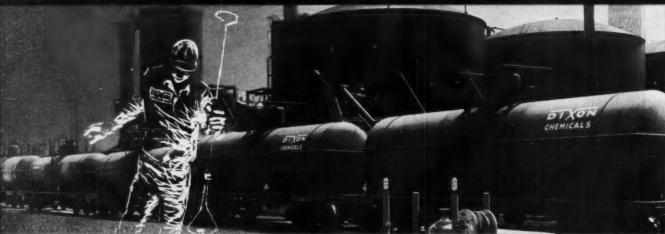
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ON THE COVER: In the offices of a Manhattan advertising agency, reporters take opening-day TV tour of Hercules Powder's new Lake Charles, La., polypropylene plant (p. 91).



Chemical Week

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Savings by Rail

To THE EDITOR: You note (March 11, p. 39) the following approximate transportation cost for bulk materials between New Orleans and Chicago: by water, approximately \$4; by rail, approximately \$7-8.

New integral train techniques conceived in this office for the transportation of bulk materials will make it possible to move materials between New Orleans and Chicago for approximately \$1.50, plus whatever transportation profit a specific traffic will bear. Such cost can be projected for points served by rail without regard to any need for waterfront improvements and include both loading and unloading. This family of techniques is applicable to traffic where significant volumes are available and where substantial-size individual deliveries can be used-virtually the same conditions as applied to bulk deliveries by water.

Some of your readers may be interested in this group of transportation cost improvements, but at the present stage their exploitation must begin with engineering investigation of specific application.

JOHN G. KNEILING, P. E. Theodore J. Kauffeld, M.E., P.E. New York

Alginate for Dyes

To THE EDITOR: Your article on fiber-reactive dyestuffs (March 25, p. 53) indicating a future growth potential will certainly receive huzzahs from all those who are interested in improving textile technology. An interesting side growth will be in the sale of sodium alginate, the thickener recommended by all of the dyestuff manufacturers noted in your article.

> EDWARD MENDELL President Edward Mendell Co. Inc. Yonkers, N.Y.

Kennecott's Engineering

To the Editor: . . . We would like to call your attention to the "Face Lifting Largest Smelter" story (Feb. 4, p. 41).

Paragraph two should have read: "In the first stage a new materialshandling system, engineered by Western Knapp Engineering Co. (San Francisco), will be renovated to automatically mix the silica ores, lime, copper ore, etc., going to the reverberatory furnace." We would like to lay claim to the important and difficult phase-the engineering.

Much of the Garfield construction dated back to the early 1900s. Later modifications and additions made any old drawings of little or no value. It was necessary therefore to make complete field surveys both inside and out. . . . Another firm was awarded the construction phase. . . .

WM. F. HADDON Western Knapp Engineering Co. San Francisco

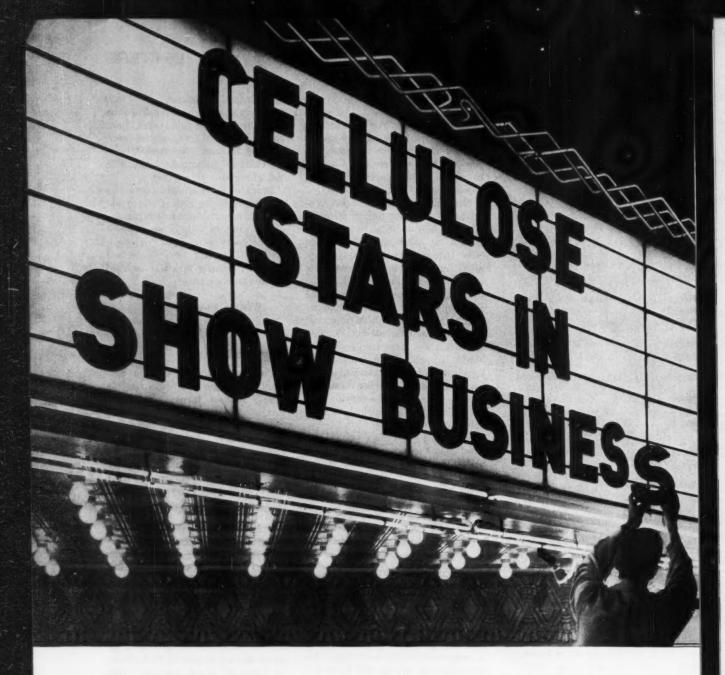
Buy American?

To THE EDITOR: I want to congratulate you on your editorial "No Selling Without Buying" (Feb. 11,

There is no doubt that there is a growing "Buy American" feeling. More and more poeple are insisting that they buy goods produced in the United States. This attitude comes at a time when unemployment is increasing, yet the national policy remains fixed in the direction of free trade. The fact of the matter is that our exports are increasing and will continue in that direction as both industry and government are committed to such a drive. Foreign Commerce Weekly, published by the U.S. Dept. of Commerce, indicates that a great deal of time, effort and money are being expended to increase the free flow of trade. In '60 the value of goods shipped topped by \$4.5 billion the value of goods imported. This means, in the general sense, that American labor came out far ahead in world trade.

I read an article the other day that said that 80-90% of the parts used in the manufacture of automobiles produced in Detroit were made abroad and imported into the U.S. Watch movements are imported from Swizterland and assembled in this country. White Sewing Machine Co., which employs hundreds of Clevelanders, makes its machine heads in Japan and the motor frame and cabinets in this country.

Most people feel that the increase in imports has a direct relationship to



in a big way. The lustrous, weather-resistant letters on most theatre marquees are molded from cellulose plastics. On spectacular billboards, giant brand names faced with cellulose plastics attract the attention of passing crowds.

Today the biggest show business of all is the display of products in modern supermarkets and department stores. Here cellulosic films and plastics show off thousands of items attractively, while protecting them completely. The varied forms of cellophane and cellulose derivatives offer a wide choice of packaging and display materials.

If you produce plastics or films, we'd like to show you how highalpha Buckeye Cellulose can contribute the desired clarity, stability, strength, flexibility and other characteristics. Our forty-year experience and knowledge of cellulose applications are at your service. When you work with Buckeye you get creative assistance, rigid quality control, and a dependable source of supply.

BUCKEYE CELLULOSE CORPORATION

Cotton linters plant at Memphis, Tennessee . Wood pulp plant at Foley, Florida



lower wage rates abroad. This is not completely true; some of the countries abroad had a tremendous rebuilding job after World War II and have not had so much obsolescence built into their plants, consequently were able to go into more refined techniques.

When we say "Buy American," let us consider three things: (1) over-all, the money that is spent on imports is topped by the money derived from exports; (2) everytime we prevent a product from being imported into the U.S. the same country acts to bar a product made in the U.S.; (3) let us remember that about 4.5 million jobs in the U.S. depend on products we make for export.

TED R. STEVENSON Vice-President Trans-Plastics Corp. Cleveland

Support from Canada

To the Editor: It was a pleasure to read your sympathetic Viewpoint (March 11 p. 5). Many U.S. publishers have taken the attitude that the tax measures introduced were just another anti-American act, whereas they were an unfortunate necessity.

Your calm reasoning approach was most refreshing.

D. A. CLARKE Dorval, Que., Can.

PVAc, Not PVC

To THE EDITOR: [Re a] . . . misquotation in your article "Opening New Growth Routes" (Feb. 11, p. 41).

You stated, "Later this year Harchem will launch a series of dimer acid compounds, and a polar polymeric plasticizer for polyvinyl chloride." This should read, "... a polar polymeric plasticizer for polyvinyl acetate." . . .

Management of Wallace & Tiernan

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y. and Harchem were very pleased with CHEMICAL WEEK'S treatment of their future growth plans.

W. C. WILEY
Manager, Product Development Dept.
Wallace & Tiernan Inc.
Harchem Division
Belleville, N.J.

TO THE EDITOR: I've just read your article on Harchem in CHEMICAL WEEK. The article is certainly well done and we appreciate the good job that you did on it. . . .

BRUCE S. AINSWORTH
President, Harchem Division
Wallace & Tiernan Inc.
Belleville, N.J.

Water Pollution . . .

TO THE EDITOR: Re "Waterfront Pollution" (Feb. 11, p. 31).

The upper Mississippi River has similar problems. State agencies have not taken the leadership in solving the problem. Citizens groups still must pressure state agencies into doing the job they are being paid for.

In this state, as in others, you can't kill wild life. The laws concerning damage to humans are less firm in the pollution area. Your magazine... has helped alert the public and the industry to a growing problem. Keep it up.

WILLIS J. OLSON Clear Air Clear Water Unlimited St. Paul, Minn.

. . . And a Palliative

To the Editor: Waterfront pollution will continue to be a nightmare for industrial concerns, shipowners, port captains and town fathers until such time as coordinated efforts among them to stock spill-fighting chemicals becomes a reality.

We respectfully take issue with your statement that "no matter what goes wrong, there's little that can be done to correct it." In one of the very cases you cite in your article, our new development, SLIX, was used to render the oil spill unable to support combustion. . . Another company mentioned in your article also stocks it for just such emergencies.

Not only do oil, gasoline, naphtha, jet fuel spills lose their explosive and ignition characteristics when treated with SLIX, but also the resultant



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mixture cannot cling to pilings, harbor craft or wildlife. Obviously, this is not the complete answer to stemming pollution but it is one important control in the over-all problem. . . .

PHILIP F. ROSE General Sales Manager The Penetone Co. Tenafly, N.J.

Lying with Statistics?

To the Editor: The Report "Peril in Numbers" (Feb. 18, p. 63) was very provocative and certainly pointed up the desirability of management's being familiar with statistical procedures and the accuracy of forecasts, particularly if the latter are to be used as the basis for decision making.

The arithmetic chart (p. 65) purporting to show the distortion of growth rate of FRB index and formaldehyde output disturbs me, however, since this is really a clear illustration of two other frequently committed errors: (1) improper use of different scales in comparing two sets of data, and (2) actual improper comparison of data.

Thus, by decreasing the left-hand ordinate scale and increasing the right, the apparent picture could be reversed and organic chemicals would appear to be growing faster than formaldehyde. Actually in order to chart comparable data, the index of formaldehyde production (1957=100) should have been plotted against the FRB index or organic chemical production against formaldehyde production.

There is certainly no argument with the conclusion that arithmetic curves should not be used to determine or project growth. The moral I draw from the above, however, is: to illustrate one bad practice, do not use two more—at least, not without pointing them out also.

A. G. Rossow Manager, Market Research Dept. Mobil Chemical Co. New York

TO THE EDITOR: With respect to Mr. Rossow's second point, the following may be pertinent:

To be sure, plotting an index against actual data is improper—on an arithmetic chart. Among others, one point was to show that a log-

arithmic chart prevents such a thing. The beauty of a log chart is precisely that one does not have to bother to make comparable indexes of series; the raw data can be plotted directly.

I think many readers miss what I was driving at. My point was not to draw a proper arithmetic chart, but to show how distortions resulting from a common use of an arithmetic chart are avoided by the use of a log chart. A logarithmic chart forces the avoidance of such distortions.

LEONARD H. LEMPERT

Chemico in India

To the Editor: After having spent several months in India negotiating a contract for the Trombay fertilizer complex, under the most competitive conditions, I was quite surprised to read (CW, April 1, p. 58) that "negotiations" on this contract were confined to "deciding the nature of the services."

Although I cannot comment on the other contracts you mention, this certainly was not the case on the Trombay project.

Actually, in the initial stages of the negotiation there were 14 engineering companies representing many countries, each country offering alternative methods of financing this project.

Only when DLF's financing arrangement was chosen as the most attractive by the Indian government were foreign engineering companies eliminated. Chemico's proposal at this point was still in competition with several other American engineering companies.

The final selection was made by the technical staff of the Fertilizer Corp. of India Ltd. in favor of Chemico on the basis of technical merit, proved performance and competitive cost.

With reference to the over-all project cost of \$58 million, it should be pointed out that this figure includes, in addition to the fertilizer plant itself, housing consisting of 3,000 dwelling units, plus a hospital, schools, community center, etc. The value of the chemical processing units is, of course, considerably less.

D. FULTON Vice-President Chemical Construction Corp. New York

MEETINGS

American Ceramic Society, annual meeting, Royal York Hotel, Toronto, Ont., Can., April 23-27.

American Institute of Mining, Metallurgical and Petroleum Engineers, Southwest mineral industries conference; Las Vegas, Nev., April 24-25.

American Assn. of Cost Engineers, Metropolitan New York Section, fourth annual meeting, Hotel Manhattan, New York, April 25.

The Society of the Plastics Industry, Inc., 18th annual Western Section conference, Hotel del Coronado, Coronado, Calif., April 26-28.

American Rocket Society, propellants, combustion and liquid rockets meeting, Palm Beach Biltmore Hotel, Palm Beach, Fla., April 26-28.

Technical conference on high-temperature materials; sponsors: American Institute of Mining, Metallurgical and Petroleum Engineers, and the Metallurgical Society; Carter Hotel, Cleveland, April 26-27.

American Institute of Chemical Engineers, New Jersey section, spring lecture series, topic: "The Statistical Design and Interpretation of Experiments"; research auditorium of Union Carbide Plastics Co., River Road (State Route 18), Bound Brook, N.J., April 27.

Fiber Society, spring meeting, University of Georgia, Athens, Ga., April 27-28.

U.S. Chamber of Commerce, 49th annual meeting, Washington, D.C., April 30, May 1-3.

Electrochemical Society, spring meeting, Claypool Hotel, Indianapolis, April 30-May 4.

American Zinc Institute, 43rd annual meeting, Drake Hotel, Chicago, May 1-2.

Lead Industries Assn., 33rd annual meeting, Drake Hotel, Chicago, May 2-3.

Sugar Industry Technicians, Inc., 20th annual meeting, Sheraton-Atlantic Hotel, New York, May 7-9.

Institute of Food Technologists, 21st annual convention, Hotel Statler Hilton, New York, May 7-11.

Technical Assn. of the Pulp and Paper Industry (TAPPI), annual coating conference, Statler Hilton Hotel, Buffalo, N.Y., May 8-10.

Metallurgical Society of American Institute of Mining, Metallurgical and Petroleum Engineers, first conference on "Management of Materials Research," Arden House, Harriman, N.Y., May 17-19.

Pacific Northwest Society for Paint Technology, annual symposium, Georgia Hotel, Vancouver, B.C., Can., May 26-27. From prescription to proprietary...

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	60L	60%	High	Clear, pale yellow	60.0%
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	35K	35%	High	Pale yellow	31.5%
FLAKES	DS _	100%	Medium	Light, cream colored	90%
		100%	High	Light, cream colored	90%
	K Dense	100%	High	Light, cream colored	90%
	KX	100%	Medium	Light, cream colored	90%
	KX Dense	100%	Medium	Light, cream colored	90%
BEADS	SK Bead	100%	High	White, free flowing	40%
	SK Bead High Density	100%	High	White, free flowing	40%

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Penetrant, wetting agent, metal cleaner

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Liquid detergents and household cleaners, wet textile processing, emulsion polymerization, post stabilizer for emulsions.

Drum-dried and spray-dried cleansing compounds, light and

Industrial detergents, emulsifier, dry mixing with alkalies air entraining agent.

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Same as 35KX in dry form

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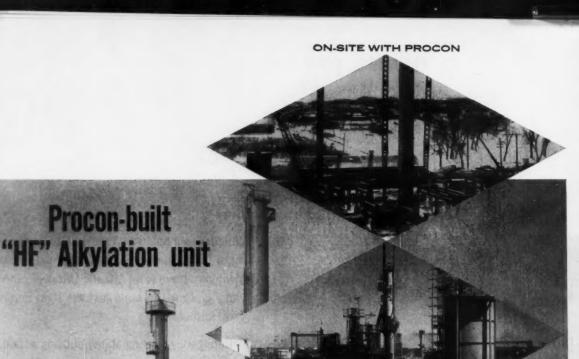
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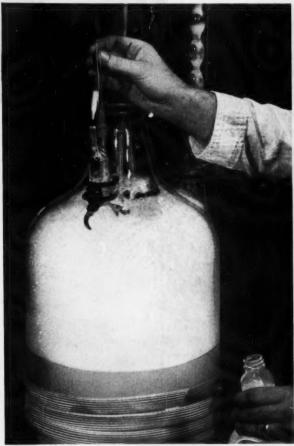
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Business

Newsletter

CHEMICAL WEEK April 22, 1961 Quick switch in partners. The long-pending merger talks between Spencer Chemical and Southern Oxygen fell through late last week. But within hours, word was out that Southern Oxygen had signed a deal with Air Products (Allentown, Pa.).

The new agreement, which shortly will be submitted for formal stockholders' approval, calls for swapping one share of Air Products common for each three shares of Southern Oxygen. (Early this week, Air Products was selling at about 73, Southern at about 23.)

The snag in negotiations with Spencer reportedly involved a rate of exchange substantially higher than originally considered, since Southern Oxygen's stock value nearly doubled while talks were going on.

In the consummated merger, Air Products gets a bigger Southeastern distribution outlet for its large-tonnage liquid oxygen and nitrogen production.

Spencer is making a big move into polyethylene latexes. The company has been pilot-planting a series of products tradenamed Poly-Em, will now put up a commercial-size plant at its Chicago works (Calumet City, Ill.). Unofficially, size of the proposed installation (to be in operation early in '62) will be 5-10 million lbs./year initially.

A merger may be near for Diamond Alkali and Bessemer Limestone & Cement (Youngstown, Pa.). Negotiations have been going on quietly for some months, but thus far no concrete merger terms have been worked out. Bessemer directors meet this week, and chances are that solid proposals for a marriage with Diamond will emerge.

The Penn-Olin sodium chlorate venture, held up for months because of the government's pending antimerger suit (CW, Jan. 21, p. 23), is still alive. Despite reports to the contrary, Olin contends it has not pulled out of the deal—the "situation is still unresolved."

This case is the first in which the government seeks to apply the Clayton Act against firms setting up jointly owned ventures. If the trust-busters' contention is upheld in the courts—that such ventures lessen competition and block entry of new producers—it may well void the merger route to corporate growth in the U.S.

Should the Penn-Olin sodium chlorate deal be broken up, Pennsalt may decide to go it alone.

Another cryogenic fluid slated for commercial production. Linde (a division of Union Carbide) will build a liquid helium plant at Amarillo,

Business Newsletter

(Continued)

Tex. Operation is scheduled for Jan. '62. Gaseous helium will be supplied via trailer trucks from the government's nearby helium recovery unit at Soncy, Tex.

Output of the new plant (capacity: 100 liters/hour) will go to U.S. research organizations engaged in cryogenic work, and for use in rocket fuel systems.

Late last year Linde boosted liquid neon (also used as a cryogenic refrigerant for ultra-low-temperature research) to commercial status. In mid-'60, the company started production of liquid hydrogen at a new Torrance, Calif., plant; total capacity for the material will be upped five-fold when a second installation starts producing at Fontana, Calif., in mid-'62.

In three years, four new polyethylene plants for the Reds. The units will go up by '64 in Czechoslovakia, East Germany, Poland and Rumania; negotiations have just been concluded in London. The principals: an East European "consortium" and Simon-Carves (a member of the Simon Engineering Group), in cooperation with Imperial Chemical Industries, Ltd.

The deal involves contracts worth an estimated \$19.6 million, marks the first time ICI has sold its polyethylene know-how to Iron Curtain countries. Simon-Carves engineers will assist in the construction and initial operation of the high-pressure polyethylene plants, but other details (including delivery of specific British equipment, allocation of work) will be worked out in further talks.

Despite reaction in U.S. chemical circles, outcome of the present contracts could pave the way for future industrial business between the West and other East European "consortia."

Meanwhile the Soviet Union has gelled plans for a Sovietdesigned refinery near Burgas, Bulgaria. First section of the refinery, with capacity for processing 2 million tons/year of Soviet-supplied crude, will be ready in '63, make Bulgaria "80% self-sufficient" in gasoline, kerosene, diesel and boiler fuel.

The refinery, though, is only part of an evisioned petrochemical complex at Burgas. Planned: a 50-million-lbs./yar polyethylene plant, units for the production of synthetic alcohol, phenol, other chemicals now being imported.

Business at Monsanto: up—but still lagging behind last year. That's the summary of sales and earnings in the first quarter of '61. In the first upturn since second-quarter '60, the company's sales checked out at \$219,354,000, with net income at slightly more than \$15,500,000. The score in the first quarter of last year: sales, \$226,295,000; earnings, \$18,943,000.

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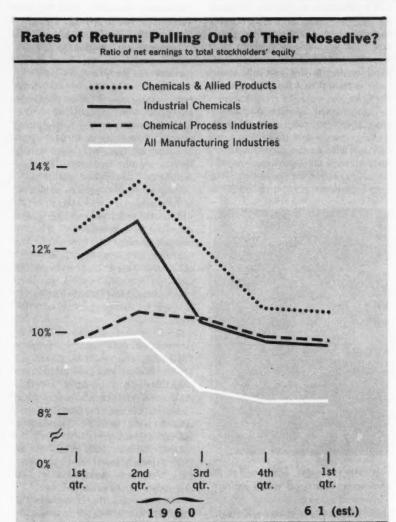
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Pinch on Payouts

Funds available for dividend payouts have shrunk again under pressure of declining profits. Threatened: new investments and future growth.

Rates of return on invested capital declined again during the last three months of '60, according to the new Quarterly Financial Report for Manufacturing Corporations, compiled by the U.S. Federal Trade Commission and the Securities & Exchange Commission. For the chemical process industries as a whole, rate of return—

the ratio of after-tax net earnings to total stockholders' equity—has now plunged more than 40% below its '56 level (chart, above).

Dividends Lagging: For companies making chemicals and allied products, profits in '60 were up only 13% from '56, although money "tied up" in these enterprises climbed more than 31% in

the same period. Cash dividend payments were up 21%—in other words, dividends did not keep in step with invested capital; and the limiting factor, of course, was net income. Producers specializing in industrial chemicals were even more adversely affected: stockholders' equity rose more than 39% over the past five years; but with profits up less than 8%, boards of directors felt that they could not lift dividend payouts by more than 13.4%.

What these trends mean to investors is seen in recent data from the New York Stock Exchange. Market value of all chemical stocks listed on the "Big Board" as of last Dec. 31 was nearly \$43.6 billion; and the cash dividends paid on those stocks during the past year totaled slightly more than \$1.15 billion-indicating an average yield of only 2.64%. This compares with the 3.37% average yield for all common stocks on the New York Stock Exchange-but neither figure appears likely to attract much venture capital. Cash dividends on those chemical stocks increased 4.1% in '60, while the increase in dividend payments for all "Big Board" stocks was 5.3%.

Pinch on Profits: Profitability in last year's fourth quarter varied considerably from one industry to another. For all U.S. manufacturing corporations (except newspapers), fourthquarter net income dipped less than 3% from the third-quarter total; but for chemicals and allied products, the drop was more than 10%, to \$441 million. This did not leave much to plow back into business after payment of fourth-quarter dividends - \$371 million. For basic chemical companies: fourth-quarter earnings, \$236 million; dividend requirements, \$214 million.

Taking the year as a whole, all-manufacturing sales inched up 2% but profits dropped 7%. The CPI turned in a markedly better performance: aggregate sales up 8.3%, to \$94,980 million; earnings down only 1.9%, to \$6,874 million.

Within the CPI, the best showing was made by companies in the "petroleum refining and related industries" category: sales up 5%, to \$30,012 million; net up 9%, to \$2,911 million.

Setback on Chemicals: For all makers of chemicals and allied products, FTC-SEC data show a 1% dip in sales last year, to \$26,972 million (although Commerce Dept. statistics indicate an 8% rise), and a 6% decline in earnings, to \$2,011 million. Data on two major chemical subgroups: for basic chemical producers, '60 sales up 3%, to \$12,658 million, earnings off 8%, to \$1,064 million; for drugmakers, sales up 5%, to \$3913 million, but a 2% boost in earnings, to \$388 million. (Profit tabulations by New York's First National City Bank: 78 chemical companies, off 7%; 29 drug firms, up 2%; 26 soap and cosmetic producers, up 12%; and 21 paint and varnish makers, off 7%.)

Makers of chemicals and allied products set aside for '60 depreciation, depletion and amortization a total of \$1,169 million—up nearly 4 from '59. Their liquid assets dropped more than 11% during the year, but their total assets were up 4%, to \$24,284 million. This included a more than 7% rise in net plant and equipment value, to \$10,241 million.

And chemical companies' longterm debt climbed more than 3%, to \$3,431 million — another indication that the current squeeze on profits is making it tougher for these concerns to attract new equity capital.

Pipeline Prospect

Two big new pipeline projects for low-cost transportation of Gulf Coast hydrocarbons in Northern and Southeastern states are heading toward the construction phase this week.

Humble Oil & Refining Co. and Lehman Brothers (New York investment firm) are organizing Monterey Gas Transmission Co., which will buy natural gas from Humble's southwest Texas reserves and move it to Alexandria, La. From there the gas will be moved by United Fuel Gas Co. for transmission by other Columbia Gas System subsidiaries to Ohio, Pennsylvania, West Virginia, Virginia, Kentucky, New York and Maryland.

Phillips Petroleum and seven other oil and gas concern have organized Dixie Pipeline Co. to carry LPG from Texas and Louisiana into Mississippi, Alabama, Georgia, and North and South Carolina.

Building and Borrowing

Contractor-financing on one large CPI construction project may be tried on the West Coast. As a general rule, engineering and construction firms don't like to double in banking, and wouldn't want to set a precedent of doing so; but in this particular case, some firms feel that the job might be worth it.

Tidewater Oil Co. (Los Angeles)—already carrying more than twice as much long-term debt (relative to total capitalization) as the current average for petroleum companies, and negotiating for a major acquisition that would require a possibly \$75-million



Tidewater's Getty: Looking for a contractor with good credit rating?

cash outlay this fall—is reportedly broaching the idea of contractorfinancing on a \$20-million project planned for its refinery at Avon, Calif.

Officially, Tidewater says only that "No specific means of financing have been decided as yet." But CW learns that Tidewater has been sounding out contractors on the possibility of having a contractor (a) build the new plant units, and (b) carry a three-year note for the entire cost.

And the response to this unusual proposition has not been entirely negative. One likely reason for this: numerous construction companies are interested in bidding on the Tidewater project, because it's considered likely that other projects of this type—an Isocracking refining unit coupled

with a hydrogen generating unit (CW Technology Newsletter, Nov. 12, '60)—are in the offing; and that whichever firm gets the Tidewater job will be in an excellent position to try for similar awards on the basis of experience and knowhow.

Principal elements in the Avon refinery project will be an Isocracking plant with capacity of 20,000 bbls./day and a hydrogen generating plant of 50 million cu.ft./day capacity; but the job will also include various treating and other auxiliary facilities.

Purpose of the project—which is to be completed some time in '62—will be to upgrade low-value stocks recovered from fluid catalytic cracking and coking operations. This will permit increased output of high-quality gasoline, jet and diesel fuels. With greater yields of 100-plus octane gasoline, raw material requirements can be reduced even though gasoline sales increase.

Over the past six years, Tidewater—with cash flow running to about \$95-million/year— has averaged \$135.8 million/year in capital expenditures. To help carry out that exploration and expansion program, President George F. Getty II has utilized what he calls "a sizeable amount of long-term debt, albeit on relatively advantageous terms." As of Dec. 31, such indebtedness stood at \$311.3 million—about 38% of the company's capitalization.

Tidewater and Pan American Oil Corp.—a Standard Oil of Indiana subsidiary—are negotiating for joint purchase of Honolulu Oil Corp. assets. Current market value of the property, based on stock price, is more than \$300 million; and Tidewater's proposed share—Honolulu's assets in California—is roughly one-fourth of the total. And Getty says Tidewater will continue its expansion program—which includes large petrochemical naphthalene projects in Delaware and California.

Thus, long on ambition and short on cash, Tidewater would be greatly convenienced to have a contractor finance the Avon project. And in this particular case, a contractor might be willing to depart from tradition and save Tidewater a trip to the bank.

Shareholders' Heyday

The season for chemical companies' annual meetings will be at its peak this week and next, with companies from Portland, Me. (American Cyanamid) to Los Angeles (Rexall Drug and Chemical) playing host to their stockholders.

Among last week's annual sessions for shareholders of CPI companies, top meeting for managerial turnover was that of General Aniline & Film, which acquired a new chairman and nearly a whole new set of directors. When the chair called for nominations for board members, Andrew F. Oehmann-a long-time Justice Dept. lawyer who is now executive assistant to Attorney-General Robert Kennedy stood up and remarked that he held the proxy for the approximately 95% of GAF shares held by the Attorney-General under the alien property law, and that he did have a few nominations in mind. His slate-elected swiftly and without a murmur of dissent-included three holdovers: company President Philip M. Dinkins, Executive Vice-President Francis A. Gibbons, and retired industrialist Thomas A. Morgan.

That same afternoon, the new GAF board met and elected Morgan as its chairman. Morgan, 73 years old, has been on the GAF board since 1951. He is also a director of Shell Oil and Lehman Corp. among other companies. He previously served as president and chairman of the former Sperry Gyroscope Co. Dinkins and other GAF officers were all re-elected.

To minority stockholders who expressed exasperation at the legal snarl that has kept the company in government hands and without money for dividends (earnings are needed for capital investments), Morgan could offer little solace. He guessed that the suit brought by Switzerland's Interhandel—asking that Interhandel be declared the rightful and nonenemy owner of the GAF stock seized by the U.S. in 1942—may be ready for trial on its merits in about one year.

Du Pont stockholders chuckled when Lewis Gilbert—who calls himself a watchdog for the interests of small shareholders—assured company President Crawford Greenewalt that at next year's meeting he will demand to know the outcome of a study to determine whether Du Pont should bring suit against any of the companies recently

convicted of pricing collusion. And the stockholders voted down, by an approximately 98% majority, Gilbert's proposal to limit bonus payments to Du Pont executives.

A management-backed proposal to change Metal & Thermit's name to M&T Chemicals was favored by stockholders owning 71% of the outstanding common shares and 58% of the preferred stock; but this was not enough to carry the move, because the laws of New Jersey (where M&T is incorporated) require two-thirds majorities in both common and preferred stock before bylaws can be amended. The new name was opposed by the minority faction that has been at odds with President H. E. Martin for the



GAF's Morgan: The government is still in the driver's seat.

past few years. All nine directors—including three representing the dissident stockholders—were re-elected.

Swelling the attendance at the Reichhold meeting were some 50 company executives from Reichhold branch offices and plants throughout the country. These general managers, product managers and division heads were brought to White Plains for a series of staff conferences on RCI expansion, financing, and new product plans.

At the Celanese meeting, Chairman Harold Blancke turned down one request for information. This was from John Gilbert, brother of Lewis Gilbert, who asserted that stockholders had a right to know "what was behind" the recent resignation of President Kenneth C. Loughlin (CW, March 11, p. 24).

Polyacetal Patents on Trial

The polyformaldehyde patent battle has begun. It has been brewing ever since companies started looking hungrily at Du Pont's thriving Delrin business.

Last week Du Pont filed suit against Celanese in the U.S. District Court of Delaware, alleging infringement. The suit charges that Celanese, in making and selling its new Celcon resin (CW, Feb. 25, p. 23), is violating Du Pont's composition-of-matter patent (U.S. 2,-768,994) covering crystalline polyformaldehyde (CW, Feb. 18, p. 139).

Hinging on the suit's outcome is not only the Celcon project, but expansion plans of several other chemical companies. Virtually every company with substantial formaldehyde capacity has been studying crystalline resin types.

Heyden Newport once said it would definitely enter the field (CW Business Newsletter, Feb. 18), but now will not comment on its plans. Commercial Solvents President Maynard Wheeler -after informing stockholders that methanol capacity would be expanded by 10% this year-told CHEMICAL WEEK that a polyformaldehyde "would certainly be the next logical step." (Formaldehyde is readily made by oxidizing methanol over a catalyst.) Wheeler speculates that Du Pont may be planning a big Delrin expansion, can see no other market for the additional methanol from Du Pont's planned expansions, which total about 60 million gal./year.

Defensive Line: Celanese will not comment on the suit, but will probably base its defense on the claim that Celcon is an acetal co-polymer (Delrin is a straight polymer), and is derived from trioxane (in turn, a formaldehyde derivative) rather than with formaldehyde. Celanese has a patent (U.S. 2,-951,059) on a continuous process for making polyformaldehyde from trioxane, with ease of handling cited as chief advantage of the raw material.

Du Pont's patent was issued to Robert N. MacDonald, of the company's central research department, in '56. It describes the material and specifies minimum values of thermal stability and toughness, laying claim to formaldehyde polymers that exceed these values.

Canadian Chemical Companies: How They Fared in '60

(All dollar figures in millions)	SALES		EARNINGS		CAPITAL	SPENDING	
	1960 Total	Change from '59	1960 Total	Change from '59	1960 Total	Change from '59	
Aluminium Ltd.	449.80	+14.63%	39.11	+62.34%	70.0	+ 9.389	
Canadian Chemical Co.	27.69	+ 5.38%	3.32	-19.42%	6.04	+305.859	
Canadian Industries Ltd.	170.74	+12.14%	6.58	+ 5.27%	8.05	+ 15.09	
Columbia Cellulose	26.22	+ 0.35%	2.55	-12.18%	30.1	+216.849	
Dominion Tar & Chemical	215.12	- 1.90%	10.08	-10.25%	17.31	_	
Du Pont of Canada	99.81	+ 9.78%	6.84	- 4.65%	6.59	- 36.489	
International Nickel	505.12	+10.35%	80.70	- 5.23%	75.97	+ 13.569	
Northwest Nitro-Chemicals	10.67	+20.98%	1.19	(Up*)	_	_	
Polymer Corp.	85.92	+42.6 %	9.85	+167.1%	4.17	+ 54.19	
Shawinigan Chemicals	45.9	+ 2.9 %	1.85	- 4.76%	_	_	
Union Carbide Canada	120.0 est.	(Down)	_	_	_	-	

Betting on Upturn in Canadian Chemicals

Although the profit-to-sales ratio in the Canadian chemical industry fell from 5% in '56 to 4.4% in '60, the industry's planned capital expenditures for '61 (\$155 million) are 40% greater than last year's. This is so, despite a recession older and deeper than the U.S. slump. Canadian capital spending for all manufacturing, moreover, is likely to be down 5% this year.

The cheerful expansion plans were revealed by the Dominion Bureau of Statistics: The chemical industry will spend \$43.4 million, it says, for new construction, and \$112 million for new machinery and equipment. The government doesn't say where the money will be spent, but observers expect most to go into pharmaceuticals, fertilizers and other specialties. (It's possible, however, that it may include part or all of the \$65 million budgeted by Shawinigan for a major petrochemical project.)

Irked about Imports: The somber recession notes come from the companies' annual reports. Blame is laid to both the recession and foreign competition. Canadian companies say that increasing competition forced them to lower prices—and earnings—in order to simply maintain sales volume. During '60, Canada imported 24% of its chemical needs—and more than half of the imports were products also made in Canada.

Other factors helped curb earnings. Canadian Chemical Co., reports a 5% sales increase, "not sufficient to offset higher costs." Petrochemical sales were up by 9 million lbs., but dollar volume remained almost the same. The company didn't complete its petrochemical expansion until this year, and 8 million lbs. of the increase came in low-profit resale items.

Du Pont of Canada explains that its 4.65% decline in earnings resulted from polyethylene start-up costs and generally lower prices. The company states: "Normal market growth in Canada is being supplied to an increasing extent by foreign manufacturers, leaving Canadian producers with a shrinking proportion of domestic business."

Hope for Domestic Market Growth: Canadian Industries, Ltd., links its and the rest of the chemical industry's slowdown to the recession, but expects the market for chemical products to grow at a healthy rate. "There now seems to be," says President Peter C. Allen, "wider recognition that new investment in chemical plants should be tied more closely to size and expected growth of this market."

The one really spectacular earnings increase — that of government-owned Polymer Corp.—reflects mainly recovery from a 15-week strike in '59, although both sales and profit did hit a new high last year. That '59 strike also figured in Imperial Oil's 57% increase in '60 sales of chemical products. Polymer is a major customer for Imperial's ethylene.

Dow Chemical of Canada doesn't

issue a report, but says that sales were up 8% in '60, although earnings were "disappointing." Most of the sales increase represents new products. Earnings were dampened by difficulty in getting a new linear polyethylene plant started, poor sales in chlorinated solvents, and a slow start on polystyrene foam.

Fuller Reporting Ahead: Electric Reduction of Canada (subsidiary of Britain's Albright & Wilson) didn't do as well in '60 as in '59, suffering from a cutback of the uranium industry which reduced demand for sodium chlorate. Also, although detergent makers took more tripolyphosphate, the price dropped during the year.

Like Dow and Electric Reduction, many Canadian chemical makers are subsidiaries of foreign companies and don't report figures separately. Bill C-70, now before Parliament and almost certain of passage, will change that, require all corporations "authorized under a law of Canada or a province to carry on business within Canada" to produce full financial statements on Canadian operations.

Canadian chemical companies are much more concerned about another law, however, that they believe will do them good: the current effort to revise tariffs, which they hope will help them win back the Canadian market. Clearly, the industry is not going into a state of despair; it is betting \$155 million that business will get a lot better.

In the Courts

Alkyd resins and potassium p-aminosalicylate were also (see p. 23) in the courts this week.

Glenwood Laboratories, Inc. (Bergenfield, N.J.) has filed a \$2.754-million suit in the federal district court at South Bend, Ind., charging that Miles Laboratories breached a manufacturing agreement on potassium p-aminosalicylate. Glenwood President Michael Fuhrmann says his company developed the compound for the treatment of tuberculosis. Glenwood obtained new drug approval (but not a use patent) and, in '55, signed an agreement authorizing Miles to produce the compound for Glenwood. Now, Fuhrmann says, Miles is offering the drug to other customers. Miles says it is not liable, but does not disclose its defense.

In another action, Atlas Powder has obtained an extension to June 1 for its answer to Ellis Foster's polyester alkyd resin patent infringement suit. In an infringement suit against American Cyanamid (CW, Feb. 25, p. 23) New Jersey Federal District Judge Thomas Meany declared the patent involved (U.S. 2,255,313) to be invalid.

Merge or Liquidate?

In separate meetings in Cleveland late next week, stockholders of Industrial Rayon Corp. and Midland-Ross Corp. are scheduled to vote on the proposed merger of the two companies. A planned unification with Texas Butadiene & Chemical fell through last spring (CW Business Newsletter, May 7, '60).

As he did in the previous merger atempt, stockholder Roman Shvetz of New York is mounting opposition. Shvetz and his followers spiked the TB&C merger by threatening to demand payment for their IRC shares. Shvetz says he favors either keeping IRC operating as a separate company or else liquidating it, which he figures would net stockholders some \$50/-share. (He puts his own holding of IRC stock at 10,000 shares.) He is not planning to use an antimerger injunction suit this time.

Meanwhile, IRC has broken out of the red. After losing money each quarter last year the company reports a first-quarter \$324,657 profit.



NBS's Astin: In all U.S. industry, an accelerating need for chemists.

Calling for Recruits

As its "Chemical Progress Week" message this year, the chemical industry is telling high school students that it will be needing more technically trained employees each year—an estimated 250,000 by 1970.

In New York last week, the message got added support from Allen V. Astin, director of the National Bureau of Standards, who told a Chemical Progress Week luncheon gathering that during this century the number of professional chemists in the U.S. has doubled every 12 years. The discernible needs of the industry, Astin said, will require that this growth not only be maintained but accelerated in the years immediately ahead.

The luncheon—sponsored by the 55 member companies of the Chemical Industry Council of New York — honored Robert M. Shapley, 16-year-old senior at New York's Bayside High School, and his physical science teacher, Sidney Harris. The youth received a \$500 award from the American Chemical Society's New York section as the outstanding chemistry student in the area.

Following the luncheon, all 50 students who had been candidates for the award were taken by chemical company executives—acting as "scientific godfathers"—to tour local laboratories, engineering centers, and company offices.

This was the eighth Chemical Progress Week sponsored nationally by the Manufacturing Chemists' Assn.

Net Down, Spending Up

Despite low first-quarter earnings, Stauffer will be able to go ahead with a heavy spending program during the next 18 months without outside financing.

As Administrative Vice-President A. E. Albright told the Financial Analysts of Philadelphia, first-quarter earnings were down "significantly," despite the sales rise of 2-3%. The percentage drop from a year ago is probably greater than the 11% drop in earnings Stauffer felt for all of '60.

Nonetheless, Albright said, research and development expenditures will be raised 10% this year over '60's \$5.9 million. At the same time, there will be considerable expansion of both product lines and plant facilities during the next 18 months. Albright says increased sales and slightly widening profit margins in some product lines should pay the bill.

Attacking the cost-price squeeze, Stauffer is working hard on improving processes to get more capacity per hour—cheaper. Albright cites one new installation, for example, that cost \$4.5 million, but replaced three old plants. Higher sales—with higher margins—are expected to result from new products now under development.

Stauffer, characteristically, has many irons in the fire. Hottest, at the moment, seem to be plastics and rubber, particularly polyvinyl chloride, polyurethane foam, and polybutadiene. Aluminum alkyls also show promise.

Also getting much attention now are fluorine products (CW, Feb. 18, p. 33). Last week the company bought Aluminum Co. of America's East St. Louis, Ill., fluoride-producing facilities. The plant turns out sodium fluoride, sodium bifluoride, fluoboric acid, and sodium fluoborate. The Illinois plant will complement Stauffer fluorine activities at Vernal, Utah, and Houston, Tex.

Albright revealed, too, that Stauffer is thinking about going into beryllium and its oxides, is already doing work on beryllium metal and beryllium chlorides. Other glimmers on the Stauffer horizon: a move into the South American market, a new exploration method for phosphate rock, new soda ash processes, and a general look into "virgin fields in chemistry."

Soviet Research Shift

The Soviet Union is reorganizing its scientific research program in an effort to give the Kremlin a tighter grip over this work, and to speed the practical application of laboratory results.

The State Scientific and Technical Committee has been abolished, is to be replaced by the new State Committee on Coordination of Scientific Research. The new committee will be headed by M. V. Krunichev, 60-year-old veteran of Soviet industry and planning bodies. He is now deputy chairman of the Council of Ministers.

Formation of the new committee follows a meeting last week of the Academy of Science Presidium, in which members discussed problems in coordinating research, and getting resulting new products into production. The academy, itself, will devote more time to basic research, although its ties to industry will remain. The Kremlin says the task of research institutions is "primarily to expand scientific research on basic scientific problems that have great significance for the national economy."

The new committee will consist of high officials of various state scientific, economic and industrial groups. It will work jointly with Gosplan and the State Economic Council to draft nationwide plans for scientific research and for the introduction of scientific and technical achievements into production.

Veiled in Secrecy

Shawinigan Chemicals (Montreal) is planning a \$65-million petrochemical project in the Varennes area, across the St. Lawrence River from the oil refining center of Montreal East—but so far refuses to say what it will produce there.

Shawinigan—which already has formaldehyde and pentaerythritol units at Varennes—has owned up to "discussions" with various engineering companies about possible production of ethylene and derivatives.

And industry observers are guessing that Shawinigan is thinking of putting up a steam cracker that would convert heavy naphtha feed from any of the six local refineries into ethylene and aromatics. The latter could be returned to the refinery—possibly for benzene production.

national roundup

Rounding out the week's domestic news.

Companies

Allied Chemical Corp. (New York) will build a three-story administration building at Morristown, N.J.; Frank Briscoe, Inc. (Newark, N.J.) is the contractor. The new structure, scheduled for completion by mid-'62, will be occupied by engineering and administrative personnel of various divisions, but executive headquarters will remain in New York. Allied already conducts research at Morristown; the new building is expected to bring the total number employed there to 1,300.

Thiokol Chemical's (Trenton, N.J.) Longhorn Division (Marshall, Tex.) has been awarded a \$4.9-million continuation contract from the Army Ordnance Ammunition Command for the final assembly and loading of various missile motors. Plant facility changes will soon permit Longhorn production of the Pershing propulsion system.

Magna-Bond (Bala-Cynwyd, Pa.), producer of anticorrosive surface coatings, has agreed to pool production and distribution facilities with Delka Research Corp. (Hawthorne, N.J.), manufacturer of a noncompetitive line of protective coatings.

Cyanamid of Canada (Niagara Falls, Ont.)—subsidiary of American Cyanamid—has consolidated its Agricultural Dept. and Industrial Products Dept. into a Chemicals Dept. responsible for the manufacturing and marketing of all chemical products.

Expansion

Polyester Resins: Multi-Chem Products, a jointly owned subsidiary of British American Paint Co. (Victoria, B.C.) and Chemical Oil and Resin Co. (Toronto, Ont.), will be the first Canadian company to manufacture and market polyester resins west of Ontario. Multi-Chem will produce the polyesters, tradenamed Polychem, for the reinforced-plastics industry in the four Western provinces. Production will be at Bapco's Victoria plant; Chemical Oil and Resin will provide technical services and development facilities.

Oxo Alcohols: Oxo Chemicals, a jointly owned subsidiary of Amoco Chemical Corp. (Chicago) and Pittsburgh Coke & Chemical (Pittsburgh), has signed Fluor Corp. (Los Angeles) to do the engineering, purchasing and construction of its proposed oxo alcohols plant at Haverhill, O. (CW, Feb. 18, p. 33). Projected onstream date: early '62; the unit will produce isooctyl and decyl alcohols.

Liquid Polymers: Texas Butadiene & Chemical Corp. (New York) plans to construct "larger pilot facilities" for production of low-molecular-weight liquid polymers from butadiene. Potential outlets: can coatings and surface coatings in the appliance and automobile fields. TB&C also plans to begin construction of its research laboratory at South Miami, Fla., next month. Completion is scheduled for the end of '61.



Eastman Chemical drew crowds with corn-popping display, showed heat resistance of new polyester.

New Arena for Old Packaging Film Fight

The breakneck pace of current packaging innovation—and its impact on chemical marketing and packaging—were spotlighted last week at the American Management Assn.'s 30th National Packaging Exposition in Chicago. Despite the event's second raindrenched opening in two years, thousands of showgoers thronged Chicago's new Lakefront Exposition Center.

Although the fast-moving packaging industry rolled up sizable gains in '60, there were signs at the exposition that the recession took its toll:

 Widespread concern over increasing demands for special packaging by customers, and renewed efforts by manufacturers to standardize packages, containers.

 Evidence that chemical process industries material suppliers have increasingly concentrated their efforts behind products with clear market advantages. Cutbacks in show and hospitality suite participation.

At the same time, however, improvements in both flexible and rigid packaging reflected the intense competitive struggle among CPI companies for market opportunities, point up the trends emerging in packaging today.

Hotter Film Fight: Dominant theme at the exposition was the increasingly fierce battle among flexible plastic packaging materials for markets.

This year, there were far fewer new film-grade polyethylene resins introduced at the show than last year. Du Pont showed its new "2-in-1" film; U.S. Industrial Chemicals Co. division of National Distillers and Chemical Corp. introduced its new Petrothene 232; Monsanto unveiled a resin tabbed MPE706X. All are designed to provide tougher, high-clarity films for bags.

Reflecting polyethylene proponents' views in general, USI's plastics sales director, Vincent McCarthy, predicted a 10% sales increase for conventional low-density polyethylene in '61. He saw film and sheeting demand rising to 425 million lbs., compared with '60's 350-million-lbs. level. McCarthy also looks for coating and lamination uses rising to 75 million lbs. and blow-molding applications taking up to 50 million lbs. of low-density material this year.

McCarthy's prediction for '61 sales of high-density polyethylene: 200 million lbs., with blow-molding consuming about 50 million.

But cellophane producers are not accepting the polyethylene film challenge passively. Du Pont's Film Dept. said yield increases for its six major grades of cellophane range from about 5% to a high of 19%. The gains mean that bakers, cigar and cig-

arette manufacturers will be able to wrap more packages—about 5 more—for the same price. Biggest increase was for "k" cellophane 250-201, a polymer-coated film used for bread wrapping. It's yield has been raised from 21,000 sq.in./lb. to 25,000, providing a saving to the baker of some 16%, Du Pont says.

Polypropylene Pressure: But if cellophane and polyethylene have long squared off against each other for market position, an even hotter fight may be in the making. The new threat comes from polypropylene; films made from it are being touted for a range of packaging jobs.

It is no secret that polypropylene resin producers are counting on film markets to take perhaps 70% of their output. Already, polypropylene film specialists are making the modifications that users of other resins adopted slowly. Case in point: Oriented films are offered by several manufacturers now, although the pp films have gained few markets. The increased stiffness, impact and tensile strength, barrier properties gained through orientation, leads some observers to predict that nearly 80% of all polypropylene film will eventually be of the oriented type.

National Distiller's Kordite Co. showed its oriented films, and Avi-Sun Corp. and Union Carbide's Visking Co. drew considerable interest with their biaxially oriented films (AviSun's-Olefane U, Visking's-Perflex X-1) available now in development quantities only.

Shrinkable films got a lot of attention at the show. Riegel Paper Co. drew visitors into its booth with its demonstration of shrink-film packaging for pens—which it gave to showgoers. Reynolds Metals Co.'s Woodrow J. Vogel, director of the Plastics Division (showing oriented PVC film), noted that shrinkable film consumption might quadruple—to some 25 million lbs.—if economical, higher-speed machinery were available.

Other plastic materials that won considerable interest:

- Carbide's new low-oriented polystyrene resin, said to provide greatly improved (up to four times as much) impact resistance in rigid containers, at regular prices.
- Allied Chemical Corp.'s two new films, Aclar fluorohalocarbon film and Capran polyamide film, based on caprolactam.

Aluminum's Showing: Major aluminum producers were on hand at the exposition, too, to continue their battle for markets in both flexible and rigid packaging. Paul Murphy, Reynolds Aluminum Sales Co.'s vice-president, predicted a \$20-million increase in domestic sales of aluminum packaging this year. Alcoa's vice-president, F. J. Close, prophesied that

packaging uses of aluminum wil! nearly double by '65—from last year's 245 million lbs. to 470 million lbs.

Another Alcoa vice-president, W. Turbeville, in charge of foil sales, predicted that total foil sales will advance from last year's 85 million lbs. to some 110 million lbs. by '65. And Alcoa revealed at the show that it plans to re-enter the printed foil business later this year.

The aluminum can market—which now consumes over 60 million lbs./-year—is also getting major development effort. Anaconda displayed its new spiral-wound foil can (CW, Feb. 18, p. 54); and Alcoa exhibited a line of easy-opening cans that use a tear strip for convenience. "Soft" cans—pouch-like constructions suitable for liquids as well as solids—are also considered a good bet by Alcoa for expanding aluminum markets.

Chemical Packaging: In addition to the many packaging applications of CPI products at the exposition, there were several significant displays of materials and containers for packaging chemicals.

Blow-molded 55-gal. drums, directly competitive with steel drums, pails and glass carboys, were shown by W. R. Grace & Co. and Union Carbide. Until recently, blow-molded containers were restricted to sizes smaller than 55 gal. but are now available in sizes up to 85 gal. Mate-



Showgoer jots down pertinent data.

Taking Notes at Packaging Show

Here are some of the other newsworthy developments coming out of the National Packaging Exposition:

First Polypropylene Tubes: The first squeeze-type tubes of polypropylene were displayed by Thatcher Glass Mfgr. Co.'s Plastic Container Division. Thatcher sees rapid market growth for this new application based on improved physical properties. The tubes can be steam sterilized (for medicinals) and are claimed to exhibit better resistance to passage of greases and fragrances than polyethylene does.

Plastic Paper: Monsanto Chemical's Plastics Division showed its Santofome, a polystyrene-based flexible, cellular (foam-like) sheet material with good non-slip and thermal insulation properties. Monsanto sees a variety of uses developing: picnic plate coatings, paper cup linings, thermoformed, embossed or printed decorative sections.

It's made by foam extrusion.

Measuring Heat Seals: Du Pont's Polychemicals Dept. showed a new device—the Heat-Seal-O-Scope—for examining heat seal quality. Film is placed between two polarized light filters and areas of different crystalline structure appear as zones of varying color—a good seal is of one color.

Plastic Netting: Du Pont's Film Dept. reported substantial growth in demand for its Vexar plastic netting first shown at last year's show. It's now available in a variety of thermoplastics for numerous decorative and functional uses: cable sheathing, filter cores, hair curlers, produce bags, protective sleeving. Netting is made by extruding two circular-cross-sections of fibers concentrically and revolving the die heads in opposing directions. Meeting and fusion points of the molten fibers determine netting joints.

rials used: high-density polyethylenes (both homopolymer and copolymer resins).

Grace's Polymer Chemicals Division vice-president, E.E. Winne, said blow-molded industrial containers consumed nearly 1 million lbs. of resin in '60, could use some 40 million lbs. by '65 if suitable new resins and fabricating equipment were developed.

All-plastic heavy-duty shipping sacks were displayed by several firms, and there was a hint that these bags might become more competitive if current tests on 3-mil film are successful. Until recently, films of 10 mils (in low-density polyethylene) and 6-7 mils (in copolymer resin film) had represented the thinnest practical bag walls.

Steel drums are in for competition from another direction, too. Anaconda Aluminum, which recently reported the development of a spiral-wound aluminum foil can (CW, Feb. 25, p. 76), now says 55-gal. containers can be fabricated from the same material.

Hedwin Corp. (Baltimore), manufacturer of the nonreturnable, polyethylene-bag Cubitainer, has broadened this line. It now offers four kinds of closures (screwcap, spout, plug and polyethylene flexspout), several new sizes (a new 2.5-gal. size, for overseas shipments, 1- and 5-gal. Imperial sizes) plus several new dispensing options (tear-string and probe-type).

Union Carbide's Visking Co. introduced its contender for the water-soluble film market—a polyethylene oxide-based film tabbed Hylox. Besides its application in packaging specialty chemicals (p. 64), this product is being touted for packaging various industrial chemicals, particularly those that are added in premeasured quantities.

Athough Hylox is priced at \$1.60/-lb., Visking spokesmen believe the price may fall to approximately \$1/lb. by year's end.

All told, this year's Packaging Exposition furnished showgoers with an almost bewildering array of new packaging ideas and materials. And most of them hold some importance for chemical process firms—either as likely way to package CPI products, or as fast-growing markets for CPI products.

International Hauling Paces CPI Seaway Growth

(All figures in tons)

Welland Canal			Seawa	y Project
1959	1960		1959	1960
136,330	159,206	Salt	104,051	122,314
7,761	13,814	Phosphate rock	66,307	90,294
81,237	62,847	Sulfur	90,045	72,744
10,299	46,711	Rubber, all forms	11,653	50,409
141,463	134,342	Chemicals	72,280	69,030
110,918	112,610	Sodium products	16,761	15,668
113,377	80,548	Tar, pitch, creosote	26,277	31,968
601,385	610,078	Total CPI products	387,374	452,427
27,536,558	29,249,689	ALL CARGO	20,593,142	20,310,340

Source: St. Lawrence Seaway Authority.

CPI Resets Seaway Sights

The third St, Lawrence Seaway shipping season opens this month—to the usual lack of enthusiasm by chemical process companies' traffic men. Over-all there's likely to be somewhat wider use of the waterway, although '60's use pattern may not be repeated. Domestic chemical Seaway shipping last year was up only slightly over '59 (as reflected in Welland Canal tonnages), but CPI products going the whole Seaway distance gained by more than one-third (see table above).

Although CPI imports and exports were up last year despite the economic decline (CW, April 15, p. 39) '60 was generally disappointing in total Seaway movements: the Welland Canal showed a 1.7-million cargo tonnage increase (about 6%), but the Seaway traffic itself—between Montreal and Lake Ontario—suffered a slight setback. And in total volume, international Seaway movements fell far behind domestic traffic.

U. S. imports and exports of all products moved via the Seaway in '60 totaled some 5.6 million tons, while traffic between the U. S. and Canada and local U. S. hauls amounted to over 17.3 millions cargo tons.

CPI on the Seaway: Looking at

forecasts of increased Seaway traffic in '61, most chemical producers feel they may boost their tonnages slightly, but nothing like the 10-15% hoped for by Seaway authorities.

Meanwhile, CPI shippers voice their usual complaints against Seaway shipping: delays, vessel damage, few deepwater harbors on the lakes. They are still taking a "wait and see" attitude toward promised improvements in Seaway services and facilities (CW, April 11, '59, p. 21). One major exception: Dow, whose Midland, Mich, home base lies smack in the middle of many Seaway lanes. There is even a possibility that Dow may construct a canal from Bay City (on Saginaw Bay) to its Midland plants.

One big drawback to the Seaway now is the limited depth of its channels—27 ft. As chemical firms turn more to bulk shipping, they require larger ships with greater draft for more economical movements. Now some companies partly unload their ships before entering the Seaway, but this creates scheduling problems.

A shift to bigger ships on the Seaway is already in evidence. Although a 19.8% decrease from '59 in upbound traffic through the Montreal-Lake Ontario section was balanced by

a 19.5% increase in downbound, the total number of transits was 583 less than in '59, indicating a slight increase in vessel size and volume of cargo carried. Even after large-volume shipments have been made, some CPI companies find that having to maintain larger inventories offsets any savings in transportation costs.

"Our biggest benefit from the Seaway is indirect," says one company. "Although lower costs of hauling by ship are an economic advantage, we can often get substantial rate reductions from the railroads to match them—so we're ahead either way."

The potential of easier access to foreign markets is one key to enthusiasm for the Seaway. Although many problems remain to be solved, few shippers have given up on the Seaway.

In the distant future chemical producers see wider markets and lowered shipping costs via the St. Lawrence.

Contributing to Seaway growth for international hauls, one company expects its imports and exports to increase while its domestic Seaway traffic remains almost nil.

Who, What, Where

A new kind of chemical directory has come off the presses. It is the Directory of Chemical Producers, published by Stanford Research Institute, which also publishes the Chemical Economics Handbook.

The new directory service will provide industry data in four sections: chemical products (producers and locations); company summaries (plant locations and products); state summaries (products, producers and plant locations) and a resume of new plants and expansions listing capacities and estimated costs.

Reports will be issued to subscribers on loose-leaf sheets for easy insertion into hard-cover binders. Initially the subscriptions will cost \$60/year. But beginning next year, SRI will charge \$100 for new subscriptions, while renewals will continue at the \$60/year rate.

Coverage will include industrial inorganic and organic chemicals as well as elastomers, dyes, plastics and fibers. For the present, at least, consumer specialties will not be included in the directory.

In British Packaging

The British Plastics Federation has formed a packaging group to deal with standards, statistics, transportation problems, public health and consumer protection. Thirty-eight companies in the federation have expressed interest in the new group; most of the firms are raw-material suppliers and packaging manufacturers.

British plastics packaging applications annually take about 88 million lbs. of resin, valued at some \$22.5 million.

DATA DIGEST

- Surfactants: New technical bulletins describe anionic, nonionic and cationic surface-active agents, include information on chemical, physical and bacteriological properties and applications. Treplow Chemical Co. (100 New St., Paterson, N.J.).
- New Safety Data: Four new safety-data sheets outline hazards, firefighting methods, proper handling techniques and first aid for benzene (SD-2), nitric acid (SD-5), paraformaldehyde (SD-6), anhydrous ammonia (SD-8). Manufacturing Chemists' Assn. (1818 Connecticut Ave., NW, Washington 9, D.C.).
- Radioisotopes: Catalog (No. 125) lists compounds labeled with carbon-14, sulfur-35, iodine-131, phosphorus-32, deuterium and tritium. Hazleton-Nuclear Science Corp. (4062 Fabian Way, Palo Alto, Calif.).
- Polyethylene: Brochure (No. 1) cites physical, chemical and electrical properties of a new high-density polyethylene, includes graphs comparing plastic's environmental stress cracking and resistance with those of other high-density materials. Goodrich-Gulf Chemicals, Inc. (1717 East Ninth St., Cleveland 14, O.).
- Industrial Solvent: Technical bulletin charts properties of special ethyl alcohol-based industrial solvent formulated for graphic arts and photographic industries. Technical Literature Dept., U. S. Industrial Chemicals Co. (99 Park Ave., New York 16).
- 2-Nitropropane: Data sheet (TDS No. 7) outlines storage and handling procedures, including safety precautions, for 2-nitropropane. Nitroparaffins Dept., Commercial Solvents Corp. (260 Madison Ave., New York 16).
 - Epoxies: Folder describes chem-

istry and properties of epoxy resins. Hauger-Beegle Assoc., Inc., c/o Adcraft Sales Promotion (549 West Randolph St., Chicago 6).

• Waxes: Technical leaflet outlines physical specifications for refined paraffin waxes. American Mineral Spirits Co. (200 South Michigan Ave., Chicago 4).

- Fungicides: Bulletin (No. 90) describes properties and biological activity for special series of bactericides-fungicides used in cosmetics, scaps, housekeeping products, agriculture, textiles and industrial applications. Specialties Dept., R. T. Vanderbilt Co. (230 Park Ave., New York 17).
- Silicones: New booklet (S-11) describes complete line of silicone coatings for release paper, including three emulsions, four solvent solutions and two controlled-release additives. Silicone Products Dept., General Electric (Waterford, N.Y.).
- Coating Adhesives: New monograph (No. 9 revised, \$3) outlines chemical principles and applications of synthetic and protein adhesives for paper coating. Technical Assn. of the Pulp and Paper Industry (360 Lexington Ave., New York 17).
- Epoxy Hardeners: Data sheet cites physical properties of epoxy casting and adhesive resins using three different hardeners. Isochem Resins Co. (221 Oak St., Providence 9, R.I.).
- Polyethylene Decorating: Technical-service bulletin (No. 108) outlines methods of printing and decorating polyethylene, including sources of services, equipment and supplies described. Polymer Chemicals Division, Dept. 119, W. R. Grace & Co. (225 Allwood Rd., Clifton, N.J.).
- Plastics and Fiber: Condensed catalog describes basic application information, properties and specifications for laminated plastics and vulcanized fibers. Taylor Fibre Co. (Norristown, Pa.).
- Ceramics: New supplement to "Lead in the Ceramic Industries" outlines low-firing porcelain enamels for steel. Lead Industries Assn. (292 Madison Ave., New York 17).
- Plastic Products: New, 192-page catalog lists over 800 items—tubes, film, sheets, etc.—made from most currently available plastics. Industrial Plastic Supply Division, Industrial Safety Supply Co., Inc. (574 New Park Ave., West Hartford 10, Conn.).

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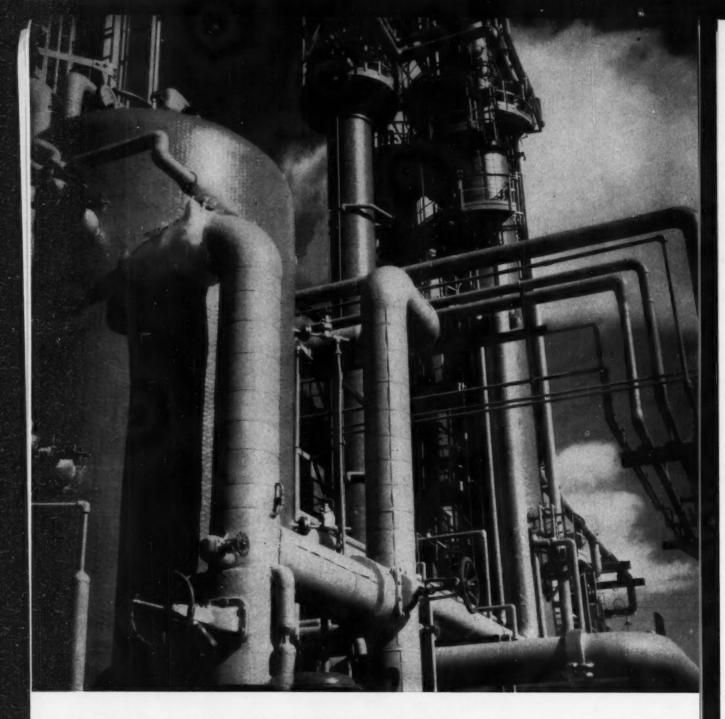


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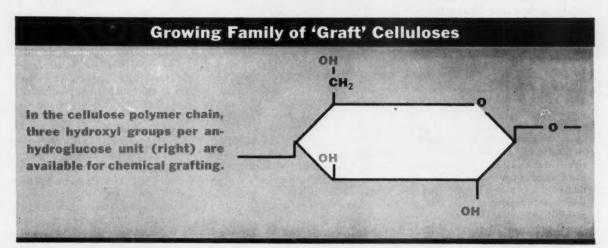
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Here are some of the reagents that can be "grafted" to these sites:

Reagent	Product	Status					
Acids (e.g., nitric, acetic)	Cellulose esters (e.g., nitrate, acetate)	Commercial since 1800s					
Methyl or ethyl chloride	Methyl or ethyl cellulose	Commercial since '30s					
Sodium chloroacetate	Sodium carboxymethyl cellulose (CMC)	Commercial since '40s					
Ethylene chlorohydrin or ethylene oxide	Hydroxyethyl cellulose (HEC)	Various types commercial low-substituted soluble type newly commercial					
Acrylonitrile	Cyanoethylated cellulose	Commercial since '60					
Vinyl compounds	Vinyl-grafted cellulose	Experimental					

Cellulose: Old Partner Yields New Product

A new degree of control in the modification of cellulose is the key to making Ethylose, the new low-substituted, alkali-soluble hydroxyethyl cellulose (HEC) brought out of the labs by Rayonier Inc. last week (CW Technology Newsletter, April 15). "Cellulose grafting" is what Rayonier terms its processing—but whatever the term, it represents the latest way researchers have discovered to tailor cellulose molecules for special properties.

The new Ethylose product is the first of a proposed series of cellulose specialties. A number of other cellulose modifications (see table above), made by a variety of processes, have been marketed, but they are generally either more completely or more randomly substituted. Rayonier claims

its process—which adds ethylene oxide to the cellulose molecule—is more fully controllable, is continuous and is readily adaptable to automation. A fully automated unit, in fact, is currently onstream at the company's Fernandina Beach, Fla., plant.

"Grafting," in the sense that Rayonier is using it (the addition of different side chains to a polymer backbone) is generally not used by cellulose processors to refer to their modifying steps. Where they do use it, they refer mainly to addition of vinyl compounds. In Rayonier's view, almost all modifications of the basic molecules can be classed as graft polymerizations. This includes such venerable materials as cellulose nitrate and acetate and carboxymethyl cellulose. Cyanoethylated cellulose, a more

recent development of American Cyanamid, is another example. And hydroxyethyl cellulose fits the term even more closely, since the side chains are often multiple units.

Rayonier's claim is that by its process for making what is essentially hydroxyethyl cellulose, it has widened the property range of such products. The material it now supplies provides a combination of characteristics currently unavailable in hydroxyethylated celluloses. Its product is insoluble in water, is alkali soluble and completely regenerable to the original material. The highly substituted products offered by others are water soluble; those with lowest substitution levels are not even alkali soluble.

In addition, there have been relatively low-substituted materials that

are soluble only in alkali, but Ethylose is the lowest-substituted HEC that readily gives a clear alkali solution at room temperature.

Low but Even Substitution: Rayonier says its hydroxyethyl cellulose differs from others by the small but evenly distributed amount of ethylene oxide added. Each anhydroglucose unit in the cellulose polymer chain contains three hydroxyl groups that are capable of reacting with ethylene oxide to form hydroxyethyl groups. A "degree of substitution" of 3 would signify that all three sites on each unit had reacted; a figure under 1 indicates that only one hydroxyl group out of several anhydroglucose units had reacted. In Ethylose, about one hydroxyl group in 20 reacts, giving a degree of substitution of 0.15 (about 4 wt.-% of ethylene oxide in the product).

Commercially available water-soluble HEC is much higher in ethylene oxide content. Union Carbide Chemicals' Cellosize, for instance, has a degree of substitution of 0.8, and a molar substitution of 1.33 (30% of ethylene oxide). The larger number of moles of reagent used than sites utilized is attributable to the fact that each hydroxyethyl group formed is a new site for ethylene oxide addition, which could lead to extended side chains. Average side-chain length in Cellosize is 1.6 units. Hercules Powder's Natrosol is even more highly substituted, with a molar substitution of 2.5 (equivalent to over 50% ethylene

At the other end of the scale, Hercules and Buckeye Cellulose both supply hydroxyethylated celluloses in the 0.2-molar-substitution range. However these products, made from cotton linters, are insoluble in alkali. Reaction is on the surface of the fibers only. Thus the substitution figure is an average for a relatively high substituted surface and a zero-substituted interior, whereas Ethylose substitution is evenly distributed throughout the cellulose (made from highly purified Southern pine woodpulp). The Hercules product, HXD-20, is produced solely as an additive for use in papermaking, where it improves the processing characteristics of cotton pulps.

Older alkali-soluble hydroxyethyl celluloses contain more ethylene oxide than Ethylose, are more susceptible to water after regeneration from alkali solution. Avcosize V6H, an 0.2-molar-substituted (5.5%) HEC made by American Viscose Co., is currently being used in finishes for cotton damask table covers. Avisco has made alkali-soluble HEC at lower levels of substitution, but these have been soluble only in chilled alkali.

Other Graft Celluloses: Cyanoethylgated cellulose is the newest of the commercial graft celluloses. Hollingsworth & Vose Co. (Walpole, Mass.) started making cyanoethylated paper for use by General Electric Co. as transformer insulation in '59 (CW, Aug. 15, '59, p. 61), and Cyanamid introduced Cyanocel for use in capacitors less than a year later. Although the reagent used—acrylonitrile—is a vinyl-type material, it reacts with the cellulose hydroxyl groups to give single-unit side chains rather than polyvinyl side chains.

Market Targets: Though it has not yet carved out any markets for the new product, Rayonier is confident that Ethylose's versatility will win it a place in a number of industries. Initial target will likely be the textile industry, for use as a size or coating. It would be particularly attractive as a binder for nonwoven cellulosic fabrics, says Michael Brown, general manager for sales, because of its chemical similarity to the fiber. Markets for nonwoven fabrics are expected to grow from 110 million lbs. in '60 to 170 million lbs. in '70.

Paper uses include additives, adhesives and coatings. Coating applications are particularly diversified. In addition to surface smoothness and gloss, Ethylose can impart resistance to air, water, grease and oil. And it can improve ink receptivity and printability.

The paint, ceramic and food industries are also seen as probable markets for the product.

Selling at 50¢ lb., the material is expected to drop in price as markets open up and the relatively small commercial plant can be expanded. Shipped in 50-lb. bags, Ethylose is stable in pellet form, easy to handle. No organic solvents are required in either the manufacture or the use of the product.

What's to Come: Rayonier's work is only one of the several current projects on adding property-modifying groups to cellulose. Much research here and abroad concerns the hooking on of vinyl compounds by any one of several means. Styrene is the most-studied vinyl material because of its availability and ease of purification, but other compounds are likely to give products with better properties. Substituted acrylates for instance, could serve as internal plasticizers in cellophane, thus eliminating plasticizer migration.

Investigators at the University of Toronto have studied both chemical and radiological methods of grafting vinyls to cellulose (CW, Sept. 24, 60, p. 102), and Dow Chemical has been active in studies of cellulose graft mechanisms, as has the British Rayon Research Assn. (Manchester).

But in any case, Rayonier has made a significant contribution: improved control over chemical reactions with cellulose. This is one important step in improving the outlook for cellulose products; opening up new markets for the products of such research is the job that lies ahead.

Fiber-Spinning Aid

A full range of experimental fiberspinning equipment is now available for public use for the first time. Fabric Research Laboratories (Dedham, Mass.) has just installed more than \$50,000 worth of equipment for contract use by any company—established in the fiber business or not.

Fiber-spinning data is generally complex, costly to obtain and closely guarded by companies that have their own equipment. A firm with a potentially spinnable fiber and no spinning equipment has, until now, had the option to associate with an established fiber company or to invest \$100,000 or so and two years in preparing an experimental spinning program, says FRL. And firms that do have their own equipment are often using it at capacity.

For a flat rate of \$100/day, plus normal staff billings, FRL offers the use of three new spinning units and a trained staff to acquire and interpret data. In addition, the firm plans to reserve 25% of the time on the equipment for its own research, the results of which will be made public through the technical literature.

The three units consist of constantpressure and constant-flow-rate batch units and a continuous unit that can



MORTON'S FAIRPORT MINE OFFERS EASTERN INDUSTRY A CONVENIENT NEW SOURCE OF ROCK SALT

Located 29 miles east of Cleveland on Lake Erie, Morton's new Fairport Mine offers a convenience "bullseye" for Eastern industry. This new mine can deliver rock salt by boat, truck and rail, whichever is fastest and most economical.

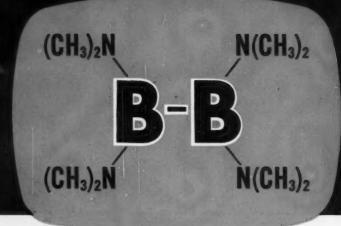
The new Fairport Mine is but one of Morton's four strategically located domestic sources of rock salt that assure Morton customers prompt, dependable delivery regardless of size or location.

Salt and service for every need. Morton has two or more sources (mines, wells and solar ponds) for any grade of salt you may need. Morton ships your order the fastest, most economical way: by truck, train, boat or barge. Morton delivers promptly, whether you buy salt by the bag or shipload. And finally, Morton sales organization is backed by the world's most complete salt research laboratory.

Write today for complete information on Morton's unique salt service for your industry.

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A First Step toward developing a whole new field of chemistry involving compounds with covalent BORON-to-BORON BONDS



Your Invitation to Research ... Tetra(dimethylamino)diboron

TYPICAL REACTIONS

HYDROLYSIS

 $B_2[N(CH_3)_2]_4 + 4 M_2O + 4HC1 \longrightarrow B_2(OH)_4 + 4 (CH_3)_2NH-HC1$ Tetra(dimethylamino)diboron Tetrahydroxydiboron

ALCOHOLYSIS

 $8_2 [\mathrm{N(CH_3)_2}]_4 + 4 \ \mathrm{CH_3OH} + 4 \mathrm{HCl} \\ \longrightarrow 8_2 (\mathrm{OCH_3})_4 + 4 \ \mathrm{(CH_3)_2NH \cdot HCl} \\ \\ \mathrm{Tetramethoxydiboron}$

TRANSAMINATION with an Aliphatic Secondary Amine

$$\begin{split} B_2[N(CH_3)_2]_4 + 4 & (\underline{n} \cdot C_4H_9)_2NH & \longrightarrow B_2[N(\underline{n} \cdot C_4H_9)_2]_4 + 4 & (CH_3)_2NH \\ & \qquad \qquad & Tetra(di-\underline{n} \cdot butylamino) diborom \end{split}$$

TRANSAMINATION with an Arematic Primary Amine

REDUCTION

 $\mathrm{B}_{2}[\mathrm{H}(\mathrm{CH}_{3})_{2}]_{4} + 2\ \mathrm{Ag}^{+} + 6\ \mathrm{H}_{2}\mathrm{O} \Longrightarrow 2\ \mathrm{H}_{3}\mathrm{BO}_{3} + 2\ \mathrm{Ag}^{+} + 4\ (\mathrm{CH}_{3})_{2}\mathrm{HH} + 2\ \mathrm{H}^{+}$

Here is the FIRST diboron compound ever offered to industry. More than two years of intensive research went into its development. Now you can have a one-ounce sample of Tetra (dimethylamino) diboron without charge—just for the asking!—so that you may join us in exploring the challenging new field of boron-boron chemistry.

Consider the column at the left. The reactions listed are but a few of the many types which are possible with this new boron-boron compound.

Don't delay! Write for TECHNICAL BULLETIN 3A/O and your sample of this interesting new diboron compound now.

USBORAX

U. S. BORAX RESEARCH CORPORATION 412 CRESCENT WAY • ANAHEIM, CALIFORNIA spin 1-5 lbs./hour of fiber. Besides using the equipment to determine the spinnability of a fiber, it also may be used to determine a number of manufacturing variables. Runs vary from short runs of single filaments to fully controlled, limited pilot production of multifilament yarns.

Capable of both melt spinning and solvent (dry) spinning, the units can handle nylons, acrylics, polyesters, polyolefins, polyvinyl alcohol and acetate.

New High in Drug R&D

A new high in expenditures for research and development by the prescription drug industry was reached in '60, according to the Pharmaceutical Manufacturers Assn. Reports from 56 companies show outlays of \$215 million, up from \$197 million in '59.

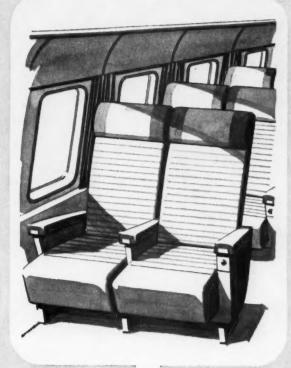
The number of scientific personnel employed in '60 was 7,200, making the research expenditure per researcher nearly \$30,000. About 600 more scientific staffers will be needed in '61. Roughly 83% of the research manpower is concentrated in the 23 largest companies (those with over \$30-million annual sales).

BRIEFS

- Rocketdyne (Canoga Park, Calif.), a division of North American Aviation, has formed a new R&D subdivision called Space Engines. The new group will be responsible for development of liquid propulsion systems for space vehicles.
- Planning Research Corp. (West Los Angeles, Calif.) has affiliated with (and may eventually acquire) Medical Nuclear Consultants, Inc. (Washington, D.C.), a firm specializing in nuclear and space medicine.
- Shell Development Co. has reorganized its Emeryville, Calif., research center. New work categories: fundamental research, basic and general engineering, oil research and development, and chemical research and development.
- Western Independent Research Laboratories, Inc. (4101 North Figueroa St., Los Angeles) is a new firm that has been formed by a group of independent small laboratories in California to perform applied research.
 - International Business Machines,



urethane foams for transportation seating



With urethane foam, the experts have found they can duplicate the characteristics of down in a pillow; they can improve the comfort in a theatre chair or plane seat. In short, they can get the exact characteristics they seek, better and at considerable savings, with urethane foams that start with the right polyols. That is where Wyandotte can help you. Contact us.



MICHIGAN ALKALI DIVISION, WYANDOTTE, MICHIGAN

CIENICALS



HOW TO RUN TWO SIMPLE TESTS ON PROCESS PIPE CORROSION

Take material samples of any corrosion-resisting pipe. Place them in beakers containing any acids, series of acids or combination of acids. Boil them, cool them or store them for any length of time you feel necessary.

Then compare the corrosion of the materials tested.

Next-look at the beakers you used! The chances are very good they are PYREX® brand beakers. And if they are, it should be evident that the beakers stand your test better than the materials tested.

You can have this same high corrosion resistance when you use Pyrex® brand process pipe.

The second test is more practical. Place one length of PYREX pipe in one of your most demanding process lines. It connects easily to other lines. Then compare it in actual use with the pipe you are using.

PYREX pipe is transparent. You can see through the pipe wall into the flow area. If you do have trouble with your process, you can locate it at a glance. No hit-or-miss dismantling. You nip minor problems before they become major. Hardly any maintenance or replacement costs to pick your pockets, either.
You can also get Pyrex "double-tough" drainline for ap-

plications where you're handling corrosive wastes. Same tough glass. Same advantages.

PYREX pipe comes in all standard sizes and fittings. Want more specifics? Write for PYREX Pipe Bulletin, PE-3.



CORNING GLASS WORKS

3104 Crystal Street, Corning, New York

CORNING MEANS RESEARCH IN GLASS

RESEARCH

Corp. has leased a building on the Spindletop Farm (Fayette County, Kentucky) to be used for special research projects. The new Spindletop Research Park (CW, Jan. 21, p. 53) will be located elsewhere on the farm.

• Aerojet-General Corp. is building a \$1.25-million research facility at Azusa, Calif., for work connected with the MIDAS satellite program.

• Electrada Corp. (11244 Playa St., Culver City, Calif.) has established a Photo-Optronic Laboratory for the study of light in relation to chemistry and electronics.

• Astrosonics Inc. (190 Michael Dr., Syosset, L.I., N.Y.) has formed a new division called Astrosonic Development Laboratories. The new division is claimed to be the first in the U.S. specifically for applied sonic research. William Fortman is director of research for the new division.

 Bausch & Lomb (Rochester, N.Y.) has set up a new optical coating process research and development department, with Harold Schroeder as head.

• Allied Chemical's National Aniline Division will concentrate more on organic chemical and dye research as evidenced by its recent creation of the position of director of research and development — chemicals and dyestuffs. Herbert Wohlers has been appointed to the new position, with offices at the division's Buffalo, N.Y., R&D center.

• Shawinigan Resins Corp. (Spring-field, Mass.) has named a trio of new research directors: Edward Lavin, director of applications research; Aubrey Price, director of product research; and Harold Weymouth, director of research administration and planning.

 Comstock & Wescott Inc., research and development engineering firm newly moved to 765 Concord Ave., Cambridge, Mass., is now offering its services to industry on a contract basis.

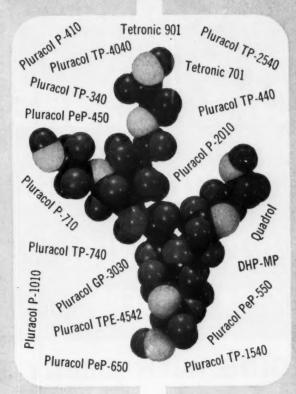
 Esso Research and Engineering Co. has consolidated its various applied mathematics groups into a new Applied Mathematics Division.

 North American Coal Corp. (Cleveland) plans to diversify into the chemical industry, has appointed John Partch to the new post of director of chemical development in its Research and Development Dept.

• Procter & Gamble will build a



higher quality urethane foams



Why? Because Wyandotte offers a whole series of polyols: diols, triols, tetrols, and hexols. Consequently, you have greater flexibility and a wider range of choice ... and Wyandotte also has the skills and experience to help you apply them to get highest quality at practical costs. Consult us and arrange to visit our urethane foam laboratories.

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COLORLESSNESS
COLORLESSNESS
COLORLESSNESS
COLORLESSNESS
COLORLESSNESS
COLORLESSNESS

BEGINS WITH EMERY STEARIC ACIDS

To obtain a light color in any product, it is easier to start with white or colorless basic ingredients. It's costly and often impossible to remove color later. Emery gives you the colorless raw materials you need—Emersol® 132 Lily Stearic Acid and Emersol 120 Stearic Acid.

When you start with colorlessness, you can add as little or as much color as you wish. And the remarkable color stability of Emersol Stearic Acids,

as assured by product specifications, minimizes color changes during processing and throughout shelf life. If the Stearic Acid you are now using cannot meet these specifications, why not let us send you samples that can, time after time. It costs you no more for this extra quality.

Write Dept. I-4A for samples or 24-page comprehensive booklet, "Emersol Stearic Acids."

a little extra everything except price

	Maxim	um Color	Maximum Color Stability						
COLOR SPECIFICATIONS	Photo Index	Lovibond 51/4" (Y/R)	Photo Index	Lovibond 5¼" (Y/R)					
Emersol 132 Lily Stearic Acid	3/0.3	1/0.3	12.5/2.3	4/1.8					
Emersol 120 Stearic Acid	5.5/0.4	1.5/0.4	22/2.6	7/2					



Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohie . Vopcolene Division, Los Angeles, Calif. . Emery Industries (Canada) Ltd., London, Ontario . Export Division, Cincinnati

research and technical services center in Brussels, Belgium. The first unit will be completed in mid-'62, will employ over 200. The center will be incorporated as Procter & Gamble European Technical Center, SA., and will serve other P&G subsidiaries.

 Optics Technology, Inc. (248) Harbor Blvd., Belmont, Calif.) is the new name of Spectracoat, Inc., research and manufacturing firm-precision thin films. The company is expanding into the fields of advanced optics research, systems development, fiber optics and optics instrumentation.

• Industrial Bio-Test Laboratories, Inc. (Northbrook, Ill.), has added 10,-000 sq.ft. for toxicological testing and is now constructing an additional 12,-

000 sq.ft.

• Jarrell-Ash Co. (Newtonville, Mass.) has expanded its laboratory services to include gas chromatography, X-ray diffraction, dissolved oxygen and fluorometry analyses.

• General Electric Co. has started construction of a new polycarbonate product and process laboratory at the firm's Mt. Vernon, Ind., plant. The \$500,000 project is to be completed by July.

• Transelco Inc. (Buffalo, N.Y.) is a new firm that plans work in chemical and metallurgical R&D and production. It has purchased part of the former Naval Ordnance plant at Dresden, N.Y., plans to start operations in June. Robert Horrigan is the new technical director.

· Allied Chemical Corp. will build a three-story, 250,000-sq.ft. engineering and administration building at its present site in Morristown, N.J. The laboratory expansion that was started at the site last fall is expected to be ready for occupation this summer.

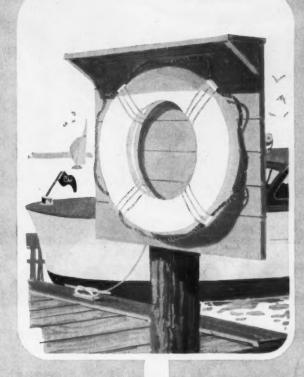
• Falstaff Brewing Co. (St. Louis) plans to expand its research and development activities. Kurt Ladenburg, formerly director of R&D laboratories for International Salt Co., is Falstaff's newly named director of research and development.

· Research in materials for space applications will be done at the 60,000thermal-kw. nuclear reactor that is going into operation at Plum Brook, O., this month.

· Fuel-cell research will be a new field of study for Onan Division of Studebaker-Packard Corp. at its newly opened 15,000-sq.ft. technical center at Minneapolis.



From Wyandotte Key Chemicals urethane foams for life preservers



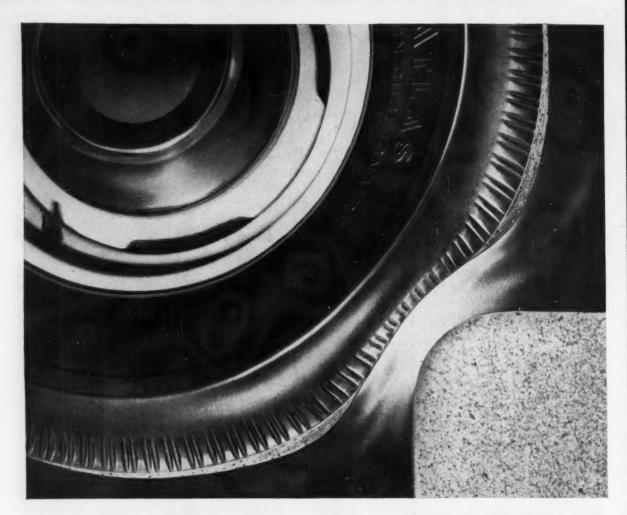
Whether you make urethane foams for life jackets or for insulating livestock barns, let Wyandotte make a foam specification appraisal for you. We'll show you how to get the highest quality at practical costs in flexible, semi-rigid or rigid foams . . . demonstrate the benefits to you of working from a whole series of polyols: Pluracol® diols, triols, tetrols and hexols, to meet your quality needs with economy. Contact us.

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IMPACT:

New Plas-Tech High-Speed Universal Tester Gives

Esso Research Dramatic New Research Tool!

THE PROBLEM Esso Research was concerned with simulating and measuring in the laboratory those high-speed forces that rubber tires are exposed to in service. Conventional slow-speed or "static" universal test equipment (e.g. capable of speeds up to 50 inches/minute) could not provide the answers.

THE SOLUTION Form Research contacted Placification.

THE SOLUTION Esso Research contacted Plas-Tech. They found the answer in a PLASTECHON Model 591A Universal Tester, which measures the stress-stain properties of materials from slow speed (1/2 inches/minute) to high speed (8,000 inches/minute). This equipment is now successfully operating in the Esso Research Linden, New Jersey, laboratories revealing,

THROUGH FULL RANGE TESTING, a wealth of new information with regard to the rate-dependent properties of materials.

THE VERSATILITY PLASTECHON Universal Testers are so versatile that their ultimate usefulness has yet to be explored, as evidenced by the wealth of new information already provided to the rubber, plastics, metals, textile and paper industries. Standard models are available at loading rates up to 15,000 inches/minute with prototype units capable of loading rates up to 200,000 inches/minute.

To broaden your knowledge of your products . . . contact Plas-Tech, consultants in materials research.



NEW DIMENSIONS IN MATERIALS RESEARCHY

plas-tech

EQUIPMENT CORPORATION

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OVERSEAS REPRESENTATION AD AURIEMA, INC., NEW YORK

Washington

Newsletter

CHEMICAL WEEK April 22, 1961 The Kefauver-Celler bill to "bring down drug prices" is given only a slight chance of passage this year. Even its most ardent supporters agree it is the type of legislation that usually takes several years to get through Congress because it represents so drastic a departure from past practices.

The measure would amend the Sherman Antitrust Act, the patent laws, and the food, drug and cosmetic laws to (1) require federal licensing of prescription drug manufacturers, (2) make the Food & Drug Administration pass on a drug's efficacy as well as its safety, and (3) force patent holders to license new drugs to qualified applicants. Exclusive patents on ethical drugs would be limited to three years.

In a joint statement, Sen. Estes Kefauver (D., Tenn.) and Rep. Emanuel Celler (D., N.Y.) said the aim of the bill is to bring drug prices down by increasing competition in the industry. The Pharmaceutical Manufacturers Assn. replies that the aim is "to destroy or seriously impair systems which have helped to make the U.S. great and which have made possible tremendous advances in medical cure." It says the proposals would increase drug prices.

Shipment of "sensitive" goods to Communist countries will be covered by a new set of ground rules soon. Kennedy is expected to approve new export control procedures recommended by Commerce Secretary Luther Hodges. Main point would be a six-man Cabinet committee, each member having a virtual veto over export licenses. The President would have the final say in case of deadlock.

The idea is to prevent recurrence of the recent fiasco in which Commerce first approved, then suspended, and finally canceled a shipment of high-precision grinding machines to Russia. Involved were Commerce, Defense Dept. and the Senate Internal Security Subcommittee.

In the past the Commerce Dept. has approved most shipments of chemicals to Soviet bloc countries but has denied a number of requests for licensing of technical data for several plants—e.g., carbon black, maleic anhydride, synthetic rubber. It has, however, approved other recent applications involving technical data on chemical and pharmaceutical processes.

Fuel cells using a mixture of oxygen and sodium or hydrogen will soon power a submarine. The Navy says it will convert a conventional diesel-fueled submarine to operate on fuel cells within two years. A land-based prototype will be built in the coming year. Long range, the Navy hopes to build a fleet of small attack submarines powered by fuel cells.

The Navy makes it clear that submarines powered with fuel cells will augment, but not replace, the large fleet of nuclear-powered

Washington

Newsletter

(Continued)

submarines now planned. The Navy doesn't plan to convert existing conventionally powered subs to fuel cell propulsion.

The Navy says that with fuel cells it can get an 80% efficiency ratio compared with only about 40% from nuclear or conventional power. Other advantages: the cells extend the underwater operation period of a submarine to a matter of weeks instead of the two to three days typical of conventional submarines. Fuel cell-powered vessels, too, will be cheaper and quieter than nuclear-powered submarines.

Currently, the Navy is thinking of using fuel cell power for a fleet of submarines only one-half to one-third the size of *Nautilus*-class nuclear boats. Costs would be reduced on the same order.

Sale of the U.S. Naval Ordnance plant at South Charleston, W. Va., to Food Machinery and Chemical Corp. (CW, April 15, p. 42) is official. The General Services Administration disclosed acceptance of the company's \$4.3-million cash bid for the entire plant, one of the government's largest surplus properties.

GSA says it has received assurances from FMC that it will "promptly commence construction of a multimillion-dollar chemical plant on the site . . . creating a substantial stimulus to the economy of the area and providing a permanent source of employment." The area now is one of substantial unemployment.

The perennial bill to protect animals used in research from inhumane treatment has been introduced into Congress by Rep. Martha Griffiths (D., Mich.). It would deny federal funds to institutions that fail to provide humane treatment. No date has been set yet for hearings by the House Interstate and Foreign Commerce Committee, but the bill is given virtually no chance of approval this year.

Sen. John Sherman Cooper (R., Ky.) has indicated he will not reintroduce his antivivisection bill this year until after the House committee has held its hearings on the Griffiths measure.

The new helium conservation program is running into financial snags. The House Appropriations Committee now says the Dept. of Interior may spend up to \$15 million for the purchase of helium in fiscal '62. Although this is considered adequate for actual purchases, Interior officials were disheartened by a limitation put on contracting authority for purchases to be made in future years. Moreover, without contracting authority, the department can't sign agreements with firms to build helium extraction plants.

The department sought contracting authority up to \$60 million/year but was limited to \$35 million. If the House limits this authority to \$35 million, Interior officials may appeal to the Senate for an increase.

How **Pneumatic Conveying Helps Make New Mining Process Economically Practical**

Taconite processing is typical of the many varied, cost-saving applications for Fuller Pneumatic Conveying.

They're turning low assay iron ore into rich pellets on the Mesabi these days. Moving additives for pelletizing, Fuller plays a special role in this feat of engineering and production economy. Fuller Pneumatic Conveying Systems are carry-

ing fine anthracite screenings, soda ash, and bentonite from siding to storage to processingwith speed, safety, sanitation, and efficiency. With few moving parts to wear out and powered by inexpensive low-pressure air, Fuller Pneumatic Conveying Systems speed dry bulk materials anywhere that a pipeline can be run: under ground, up through floors, around corners . . . for far greater distances and at substantially lower cost than possible with mechanical conveyors.

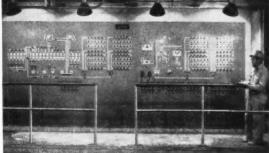


dustries from baking to mining to paper. If you move dry bulk materials, write today and learn how you can move further-for less-with air.



Four Fuller Pneumatic Systems can speed more than 307 long tons of additives through this huge Taconite Pelletizing Plant in a single day.

See Chemical Engineering Catalog for further details and specifications



Centralized control is provided by giant panel designed and manufactured by Fuller.



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IF YOU RELY ON SERVICE,
YOU'LL LIKE DOING BUSINESS WITH
COLUMBIA-SOUTHERN



Photographed in limestone mine of PPG's Chemical Division at Barberton, Ohio.

Hydrogen peroxide cotton bleaching time cut 60% . . . that's what Columbia-Southern technical ability linked with knowledge of industry needs developed for the textile trade. Vapor degreasing output boosted to all time high . . . that's an example of results achieved by the combination of Columbia-Southern Trichlor and knowledgeable technical service to the metalworking industry.

Pulp processors, glass manufacturers, leather tanners, petroleum refiners and other producers rely heavily on



PITTSBURGH PLATE GLASS COMPANY

the service that supports Columbia-Southern Chemicals. They've learned that this counsel gives them the best mileage on the chemicals they buy. Because of this practical technical assistance, combined with consistently high quality standards and cost-cutting traffic control, discriminating buyers in every industry specify Columbia-Southern Chemicals. You too may profit by doing so.

Chemical Division, Pittsburgh Plate Glass Company, One Gateway Center, Pittsburgh 22, Penna. Offices in principal cities. In Canada: Standard Chemical Limited.

Chlorine • Caustic Soda • Caustic Potash • Soda Ash • Ammonia Solvents • Sodium Bicarbonate • Chromium Chemicals Barium Chemicals • Sulfur Chemicals • Agricultural Chemicals Reinforcing Pigments • Calcium Chloride • Hydrogen Peroxide Muriatic Acid • Calcium Hypochlorite • Titanium Tetrachloride



This titanium coil has eliminated downtime due to corrosion and erosion. Result...

In hypochlorites ...

Lifetime Titanium heat exchanger pays for itself with trouble-free performance at Pennsalt

Titanium's ability to withstand hot chlorine environment, its noncontaminating and antifouling characteristics have put a stop to costly trouble before it started in Pennsalt's calcium hypochlorite process.

Two titanium heat exchanger coils are located in the heart of the operation:

Chlorinator. Chilled water pumped through the titanium coil carries off heat evolved when lime slurry is chlorinated. Coil has been completely trouble-free, despite *hot*, wet chlorine environment. No need for repairs. And the chemical buildup on the coil is easily washed off with water.

Pennsalt engineers say that the titanium coil, placed in service in 1959, still shows no sign of corrosion nor erosion. Because of this, the unit has at least paid for itself from reduced downtime. Crystallizer tank. Still in place after three trouble-free years, the titanium coil has far outperformed a vinylcoated stainless steel coil that lasted for only one year.

Titanium costs are dropping. For example... the latter titanium coil originally cost \$6,200. As an experiment, Pennsalt engineers had the unit re-estimated recently. They found that they could purchase a new coil—including an additional \$850-worth of spacers—for a total of \$4,204!

Lesson to be learned: Selection of the *right* titanium fabricator (TMCA can help you with this) is a sure-fire way of controlling your costs. Also, basic metal prices are improving. In the past three years they have been reduced by 50%.

If you are faced with maintenance problems in equipment operating in wet chlorine...or hypochlorites...or urea ...or inhibited sulfuric acid, contact TMCA. Our chemical experience is at your disposal.

CA. Our chemical experience is at r disposal.

Get the facts:
Performance data ... fabrication.
Write Today.



TITANIUM METALS CORPORATION OF AMERICA

233 Broadway, New York 7, N.Y.

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More Pressure -Fewer Fines

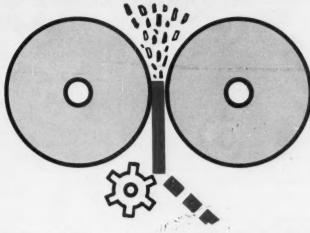
At the First international symposium on agglomeration in Philadelphia last week the chemical industry let iron ore processors do most of the talking. But the chemical industry nonetheless has a prime interest in devices to make useful "lumps" from troublesome particles, as the growing use of agglomerating equipment shows. Most recently, compacting mills have been battling briquetting machines and pellet mills for a following in the CPI.

Allis-Chalmers Manufacturing Co., which makes the compacting mill, is talking as optimistically as pellet mill makers did one year ago about the growing acceptance of its equipment (CW, Feb. 13, '60, p. 42). Already, several companies have has successful plant experiences with the relatively novel units, and their results are cheering equipment producers.

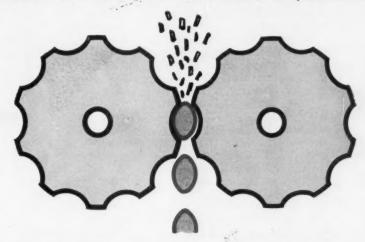
For example, early this year Consolidated Mining and Smelting began moving large urea crystals to market from its new plant in Calgary, Alta.,—the CMS crystals were produced on a compacting mill. The compactor, CMS says, helps cut dust, improves product-handling. And though this point hasn't been emphasized, it will probably help overcome urea's muchstudied hygroscopicity difficulties.

The problem is that crystalline urea often picks up so much moisture that it sets up into tombstone-like slabs in its shipping bag. Prilled urea is claycoated to overcome this moisture pickup problem. But to obtain urea with the low extremely biuret (double urea) content needed to prevent burning in foliar applications, the urea must be crystallized-and these crystals can't be prilled. Compacting, which converts small crystals into large ones, cuts down the surface area of the urea that is exposed to moisture, and cuts moisture uptake without resort to a coating.

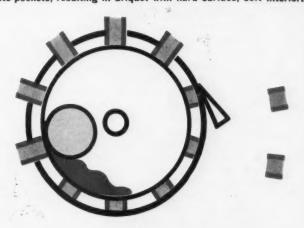
Calcium chloride can be compacted in a similar manner to produce more dense, larger granules that will also not pick up moisture. But most chemical firms that are using the comHow Compacting differs from other agglomerating methods . . .



Compacting — Particles are fed between smooth pressure rollers. Minimum contact with rollers results in sheet with surface and interior of equal hardness.



Briquetting — Particles are fed between pocketed or corrugated rollers and squeezed into pockets, resulting in briquet with hard surface, soft interior.



Pelleting — Particles inside mill are forced through holes in die. Long contact with die surface results in pellet with hard surface, soft interior.

pactor for this or a similar type of operation prefer not to discuss their trade secrets.

Competitive Edge: One reason chemical firms are chary about discussing compacting is to protect a competitive edge on cost. For example, many processes produce fines that can't be sold at the same price as product with large-size particles. The compactor can turn the fines into the higher-priced product.

Morton Salt Co. and other salt producers use compactors to turn out rock salt from fines made during the production of other grades of salt. And one lime producer is believed to be using a compactor in a similar manner.

All Its Own Area: The compactor appears to have no real competitor in the particle-upgrading process because it goes further in the compacting step than other types of equipment. The exact pressure to which the particles are subjected isn't known, but the total force needed to separate the rolls of the compactor is greater than 500,000 lbs.

"We... use sufficient force to obtain a product with 98% of the material's true density—in other words, almost to the density of the natural crystal," says George Jennrich, A-C application engineer who worked on the machine's basic development during the '50s.

Pellets and briquets generally have hard exteriors, softer centers; material from compactors is of uniform hardness throughout. Here's the way the difference is produced:

In compacting, the fine particles drop from a hopper into the compacting rolls (few materials must be forced between the rolls). The rolls are smooth, offer a minimum of contact with the surface of the particles that are forced between them. The combination of high pressure and minimum contact produces a homogeneous "sheet" of product. The sheet is usually brittle, easily broken up by a finger-type (flake) breaker. The flakes are then run through granulating rolls and screened to obtain the desired particle size. Oversize granules can be recycled through the granulating mill; undersize granules can be returned to the compactor.

In pelletizing, fine particles are forced through holes in a die. The relative long contact time with the die surface, combining with the friction produced by forcing the material through the die holes, turns out a product that is "case-hardened," still soft on the inside.

Briquetting machines — particularly high-output units—resemble compactors. The main difference is that the rolls are pocketed. The fines are squeezed into the pockets. Because the material is trapped in the pockets in relatively large quantities, rather than immediately pushed out of the rolls (as in compactors), the material at the surface is subjected to greater working—which gives a lump with hard surface and softer interior.

Which to Use: Also available are several other routes to agglomeration—such as recrystallization of readily soluble materials, or use of extrusion machines (which have characteristics similar to pellet mills). One of the simplest methods is the use of balling drums and pans in which the material is merely tumbled.

All the agglomerating techniques have shortcomings and limitations—but so have compacting mills.

Because of the high pressures involved, compactor bearings, rolls and motors must be large. The largest unit—rolls 24 in. long (face) and 24 in. in diameter—has a 200-hp. motor. With speed reducer (the rolls operate at only 30 rpm.) and flake breaker, the unit costs about \$66,000. Even the smallest unit (18-in. diameter, 8-in. face rolls), without motor and flake breaker, costs about \$17,000.

Low-pressure machines with only 150,000-lbs. roll-separating force and 20x20-in. rolls run about \$20,000—and are limited in processing applications. However, in some cases, machines with less than the maximum 500,000-lbs. separating force are the only units that can be used. For example, in starch operation, too much pressure can cause the starch to gelatinize.

The large compactors must process material at a rate of at least 1 ton/hour, according to Liouel Moore, A-C application engineer Units that are now handling potash reportedly operate at about 8 tons/hour, which is well below capacity. High capacity has prevented compactors from making a major entry into the pharmaceutical field. For example, A-C's smallest mill could process a year's output of aspirin for the tableting

machines in a matter of hours, says

Speed Plus: But in some applications compactors can overcome capacity disadvantages with processing advantages. For example, they can cut curing time (hardening to resist degradation in further processing) in starch production, actually promote grain growth in salt processing. And in some operations, such as the mechanical mixing of fertilizers, the high capacity of the units can probably be well utilized.

Compactors most likely couldn't be used if a particle much larger than 0.5 in. were desired. In the larger-particle sizes, briquetting would probably be used. Relatively small briquetting machines (about 1 ton/hour) cost about \$8,000-10,000; large (30-50 tons/hour) machines cost about \$50,000-60,000, according to Komarek-Greaves (Chicago), the largest machine fabricator.

Pellet mill makers, such as Sprout-Waldron & Co. (Muncy, Pa.) and California Pellet Mill Co. (San Francisco), generally don't talk in terms of capacity because it can vary widely with the material processed. But the average pellet mill costs between \$4,000 and \$10,000. And its processing rate is considerably lower than that of compactors or high-capacity briquetting machines.

Maintenance Costs: Pellet mill die costs are relatively high (usually more than 10¢/ton of product processed). Pocketed briquetting rolls also wear quickly. However, A-C's Jennrich points out that the smooth compactor rolls require little maintenance. For example, in potash operation, the rolls ran for two years before they needed redressing-i.e., grinding down to straighten rolls out. Only a few thousandths of an inch must be ground off and the rolls have between 0.75and 1-in. chill (depth of hardness), will last for many years before they need replacement. (The rolls are castiron alloy, contain about 3% chrome, have a soft core to absorb shock.)

Balling drums and pans are usually high-capacity, low-cost units. But because the feed must be carefully prepared to correct size (commonly 80% of feed to minus 200 mesh) and contain more than 10% moisture; feed preparation and drying of the finished product add to operating cost.

Pellet mills often require that the



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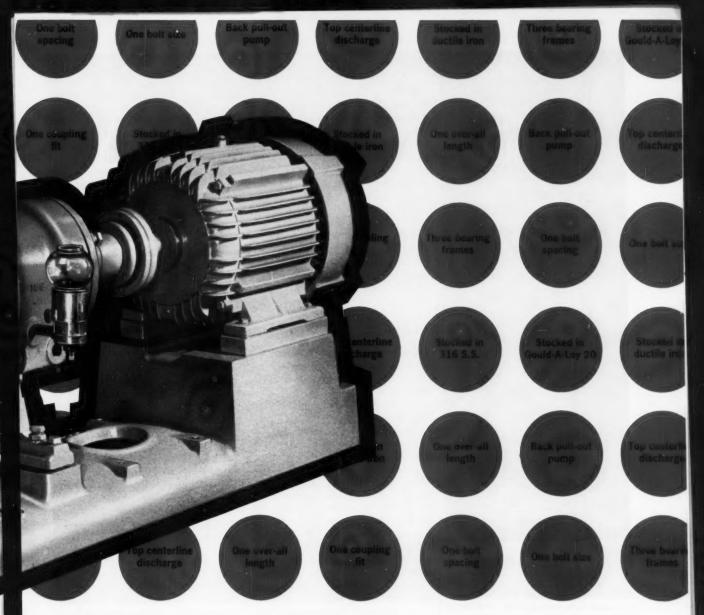
one of the 11 pump ends to any one of three bearing frames (shafts 1¼, 1¾, and 2½ through stuffing box). Service conditions will determine your choice of bearing frame.

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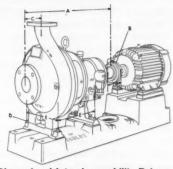
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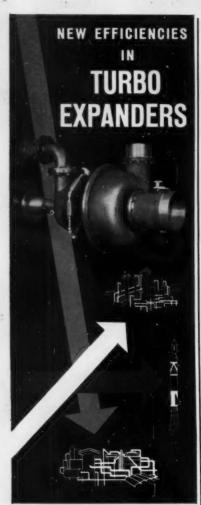
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PRODUCTION

feed be treated with a binder. Briquetting done at high pressures seldom needs a binder. Compacting at times requires some adjustment of moisture content; with materials such as salt, heating to 180-220 F before processing is all that's needed to produce a sheet that comes off the compactor completely cured.

With the various agglomeration techniques available, the proper choice is often a difficult one. Now that the compactor, a late entry in the field, has several years of successful trial under its belt, it could challenge other types of units for a top spot among the agglomeration techniques.

Electronic Eye on Cost

Engineers at the fourth maintenance and plant engineering conference of the American Society of Mechanical Engineers in Worcester, Mass., last week heard a trail-blazing type of report: details on how highspeed electronic data-processing can help control maintenance costs at a large chemical plant.

Maintenance engineers E. Albert Rachal and William E. Dougher discussed cost control at the Savannah River Plant (Aiken, S. C.) operated by Du Pont for the U.S. Atomic Energy Commission. The plant has 1,500 maintenance employees in four departments — maintenance, instrument and electrical, traffic and transportation—performing work over a widely spread-out plant area.

The electronic data-processing system was picked because it has the flexibility needed for giving each management level (foreman, area and division supervisors) separate reports in the detail each requires. The speed, versatility and capacity of the electronic data-processing equipment that was already in use for other plant services were so far greater than those of standard computing equipment that the maintenance group was able to ignore machine limitations in setting up the program.

Contractor Concept: To assure that the program would meet requirements and give helpful data, the group adopted a plan it called the contractor concept.

Here's the way it worked:

Each repair request was initiated by a "customer" (in this case, the process department foreman). The repair order was assigned to a "prime contractor" (the foreman of a works engineering department). The prime contractor responsible for the work assigned portions of the repair to "subcontractors" as required. The reports normally needed in such a relationship were then easily worked out.

Ultimately, six reports were developed for the system—a repair order cost report for the foreman, four maintenance expenditure reports for each level of supervision, and a personnel distribution report. The data-processing machines were selectively programed to give each supervisor only the specific information he required.

Rachal and Dougher pointed out that a small plant couldn't justify the use of high-speed electronic data processing unless it could join with other plants within a company to use a single data-processing center.

An alternative: the pooling of requirements by different companies to obtain outside equipment on a proratā cost basis. But in describing the data-processing system Rachal and Dougher showed that the reports used at Savannah River are little different than those needed by any effective maintenance department—the goal of useful data, not the data-processing technique, is important.

EQUIPMENT

Leak Detector: Crosby-Teletronics Corp. (Westbury, N. Y.) is out with a new, highly sensitive mass spectrometer for detecting leaks in vacuum, pressure and hermetically sealed systems such as atomic-reactor equipment, heat exchangers, power tubes and transistors. Called Model 600, the electronic unit has a sensitivity of 10^{-12} cc./second, which is said to be 100 times more than that of conventional helium-actuated leak detectors.

High-Temperature Pyrometer: Pyrometer Instrument Co. (Bergenfield, N. J.) will manufacture a new pryometer for instantaneous measurement and regulation of temperatures to 4000 C. The unit, developed by Atomics International, a division of North American Aviation, will record temperature changes of less than 1 C, has special attachments for operating to temperatures of 10,000 C. The

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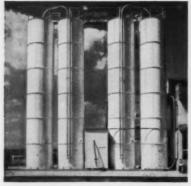
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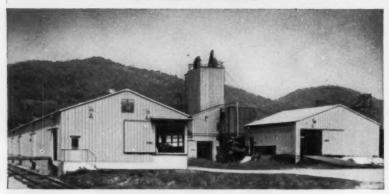
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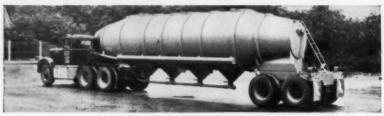




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PRODUCTION

unit is recommended for control of ceramic ovens and blast furnaces.

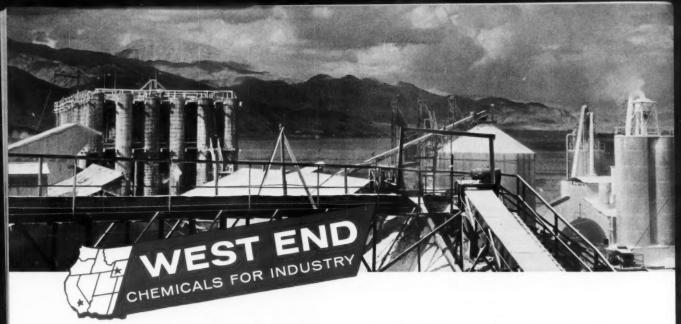
Cryogenic Butterfly Valve: B. H. Hadley (1427 South Garey Ave., Pomona, Calif.) is out with a new, 3-in. butterfly valve for liquid hydrogen and LOX. The valve has a leakage rate of less than 10 cc./minute of helium at cryogenic temperatures. It has a double-acting pneumatic actuator and four-way solenoid.

Polypropylene Filter Fabrics: Technical Fabricators Inc. (136 Washington Ave., Nutley, N.J.) has added combination multifilament-spun staple fabrics to its line of polypropylene filter fabrics. The fabrics are available in plain and twill weave variations for plate-and-frame presses, rotary-vacuum filters and dust collection units. They are recommended for hot, corrosive applications in separating gelatinous precipitates and fine, abrasive

Gravity Feeder: Norcross Companies (19 Osborne St., Bloomfield, N.J.) is offering a new constant-rate gravity feeder to fit all closed-head steel shipping containers. The feeder, made of polyvinyl chloride, has micrometer settings for regulating flow from drops/minute to gallons/hour. It has a head-loss equalizer to compensate for descending liquid level in the drums, fits 2-in. openings.

Control Valve: The Worthington Corp.'s Annin Co. (division (1040 South Vail Ave., Montebello, Calif.) is offering a new control valve that is self-draining. Called Model 1900, the valve's body and trim are designed with all surfaces sloping downstream, making the valve self-draining when installed in a horizontal or vertical position. It is available with screwed connections in 1/2- to 2-in. sizes; flanged connections in 1/2 - to 6-in. sizes.

Low-Flow Meter: Devco, Inc.'s (Hatboro, Pa.) new Model 125 flow meter for purge and low-flow applications is now available as an off-theshelf item. The meter body has a wrap-around Plexiglas shield for sidelighting that makes the meter tube easier to read. Interchangeable tubes give the meter a range of 0.2-90 cfh for air, 0.05-20 gph for water.



For over 36 years, Industry has looked to West End Chemical Company as a dependable source of chemicals. Soda ash, sodium sulfate, salt cake, quicklime, hydrated lime and borax are included in the product line.

Located in the Mojave Desert some 190 miles northeast of Los Angeles, West End's Searles Lake location has long been recognized as one of the world's largest sources of inorganic salts. Searles Lake, which is now dry, was formed through the ages by waters carrying small quantities of the various salts in solution from the Sierra mountain range to what was then an inland sea. Subsequent volcanic activity blocked off the flow of these waters, leaving the lake to evaporate to its present day level. These acts of nature caused enormous quantities of inorganic salts to be left in the Searles Lake Basin.

West End's connection with Searles Lake dates back to that period following World War I when numerous companies were experimenting with various processes for extracting mineral wealth. After a number of years of experiment and research, the Hellmers Process (H. D. Hellmers, now West End Vice-President, Production) was adopted, and it is still the basis for today's operations.

Briefly described, the Hellmers Process involves the pumping of brine from the lake, treating the brine with carbon dioxide gas to form sodium bicarbonate which precipitates out. In the carbonation phase of the process, the borates contained in the brine as sodium metaborate and sodium tetraborate are converted to the more acid

higher borates of sodium by the reaction of CO₂, eliminating part of the Na₂O by forming NaHCO₃. After separation of sodium bicarbonate from the carbonated brine, the latter is mixed with additional untreated brine from the lake in such proportions that practically all of the borates in the mixture are in the form of sodium tetraborate. This results in a state of supersaturation with respect to sodium tetraborate, which is crystallized from the mixture by the simple process of cooling and agitating. After settling, the brine is sent to the sodium sulfate recovery units and the settled borax recovered and refined. The bicarbonate recovered in the first step of the process is filtered, washed free of impurities, and converted to various grades of soda ash.

For a number of years soda ash and borax were West End's sole products. In 1938, installation of a hydrator made it possible to market hydrated lime.

In 1955, encouraged by the growth of the kraft pulp and detergent industries, West End made its first offering of salt cake and anhydrous sodium sulfate. In the intervening years, West End has become a major national source of these chemicals.

The new West End soda ash plant now under construction at a second natural source in Wyoming is scheduled on-stream in 1962. Produced under the same uniform management and controls of the parent plant, high quality West End soda ash from Wyoming will be available to industry in an ever-broadening market.

WEST END CHEMICAL COMPANY

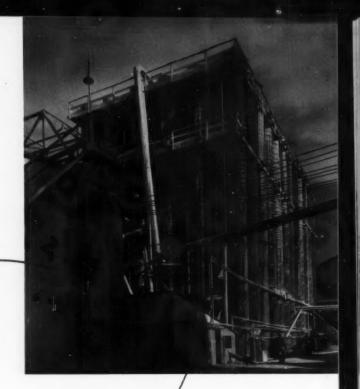


636 California St., San Francisco, Calif. . Plant, Westend, Calif.

SODA ASH . BORAX . SODIUM SULFATE . SALT CAKE . HYDRATED LIME . QUICK LIME



West End Chemical Company produces two types of soda ash through the aforementioned Hellmers Process. West End 58% Soda Ash is a fully refined, high-analysis product which is guaranteed 58% Na₂O, but regularly runs 58.42% to 58.45% Na₂O. Glassmakers Coarse Dense soda ash is tailored to the needs of the glass container manufacturer. It contains 1-1.5% Na₂B₄O₇ in a common crystal with the carbonate. IT IS NOT A MIXTURE. This boron content is highly desirable in the glassmaking industry because it acts as a flux in the melt and gives the ware brilliance, surface hardness and resistance to thermal shock.



58% SODA ASH

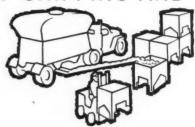
TYPICAL ANALYSIS								SC	REE	N S	SPE	CIFI	CA	TIO	NS					
Na ₂ CO	3		Gu	ara	nte	nd G	. 00	5%	99.8%	+100										
No RO									.06%	+150										
										+200										99%
Na SO									.04%	-200										1%
NaCl									.03%						•			•	•	. ,0
Na ₂ O									58.4%											

GLASS MAKER'S COARSE DENSE SODA ASH

TYPICAL ANALYSIS							SCREEN SPECIFICATIONS											
Na,CO,								97.6%	+100									77%
Na,B,O,								1.2%	+150									93%
Na,SO,									+200									98%
NaCl .								.35%	-200									1.5%

METHODS OF SHIPPING AND CUS

Jumbo rail hopper cars with 60% additional capacity. It is also shipped by truck or ocean vessel. Bulk and semi-bulk unloading and handling systems for soda ash enable many users of packaged soda ash to benefit from lower bulk prices and reduce their in-plant handling costs.



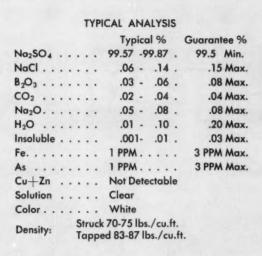




Since mid-1955, West End has been recognized as a major producer of high-quality anhydrous sodium sulfate. Original production capacity of sodium sulfate at the West End plant was 50,000 tons annually, but with completion of a second sulfate unit in the fall of 1956, production capacity was increased to 120,000 tons per year. With completion of a third unit in 1961, capacity will increase to 200,000 tons per year. Today, West End is solidly qualified to handle the complete requirements of its customers dependably, economically and efficiently.

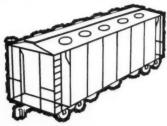
High-solubility, high purity, low heavy metal content, and pure white color are the distinctive features of West End anhydrous sodium sulfate. It is used in avaried number of industrial processes, with major buyers being detergent manufacturers and chemical compounders.

ANHYDROUS SODIUM SULFATE

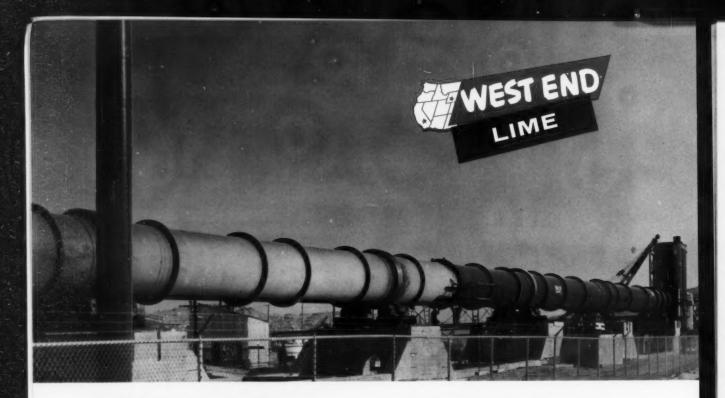


TYPICAL S	CREEN SPECIA	FICATIONS
Screen No.	Coarse %	Fine %
+ 20	Trace- 0.5	0
+ 30	Trace- 2.0	Trace
+ 40	4.0- 8.0	0.4
+ 50	12 -20	2.0
+ 60	25 -35	6.0 to 12.0
+ 80	40 -52	12.0 to 15.0
+100	56 -68	21.0 to 26.0
+150	70 -75	30.0 to 34.0
+200	80 -92	44.0 to 57.0
-200	8 -20	56.0 to 43.0

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at great distances by truck, ocean vessel or by West End's own fleet of leased covered hopper rail cars. West End schedules transportation to assure customers of delivery on scheduled delivery dates.



HYDRATED

West End Hydrated Lime has been used in a variety of chemical and industrial applications since 1938. Primary uses of this product are in water treatment, treatment of acid wastes, process pH control and agricultural lime sprays.

QUICKLIME

West End as a dependable source of quicklime was established in 1956 by the installation of a 340 foot kiln. The material has found favorable acceptance in water treatment and a variety of industrial applications. Quicklime is shipped in bulk in hopper trucks or hopper cars.

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CW PROTO-ROSENBLUTE

Antara's Freifeld, Leibowitz, Dalton view samples of vinylpyrrolidone-ethyl acrylate copolymers.

Launching New Copolymer Contenders

Antara Chemicals Division of General Aniline & Film Corp. (New York) is launching the first three products in a series of high-molecular-weight copolymers that have vinylpyrrolidone as the common monomer. The products, to be marketed under the tradename Polectron, are comparatively high priced. But for the cost, premium users will be getting a number of special properties.

The three lead-off items, supplied as 40%-solids emulsions: Polectron 130, a vinylpyrrolidone - ethyl acrylate copolymer; Polectron 430, a vinylpyrrolidone-styrene copolymer; and Polectron 450, another vinylpyrrolidone-styrene material but with a higher content of vinylpyrrolidone. They are now being made in developmental quantities at Linden, N. J., are slated for full-scale production late this year at Antara's Calvert City, Ky., operation.

Antara will first emphasize the strong adhesiveness and dye receptivity of the new products. It will likely concentrate its selling efforts on makers of textile and paper coatings and glass-fiber sizes (where adhesiveness is important). Other targets: nonwoven binders and latex rug backing (where dye receptivity is an important factor).

Upgrade, Not Replace: The list of potential applications is lengthy. According to Phil Dalton, manager of Antara's Acetylene Chemicals Dept., the compounds may find use in the manufacture of adhesives, floor polishes, paint, aerosol starch, leather finishes, and detergent opacifiers. He points out, however, that the new copolymers aren't designed to replace large-volume emulsion products—close to 600 million lbs./year (dry weight) of these latexes are now being used—in these fields.

The chief use of the newcomers, instead, will be to upgrade existing latex emulsions.

If nothing else, the present price of the new copolymers—ranging from 35-45¢/lb. for 40%-solids emulsions

—would seem to preclude their wresting any volume markets from existing water-emulsion products. For emulsions of approximately the same (or higher) solids content manufacturers are now paying around 19-21½ ¢/lb. for polyacrylate emulsion; about 15¢/lb. for polystyrene emulsions; 16½-18½ ¢/lb. for polyvinyl acetate emulsions and about 15¢/lb. for butadienestyrene emulsions.

Polectron prices will doubtless drop eventually, however. With a vinyl-pyrrolidone capacity-doubling expansion almost completed (Antara is sole U.S. supplier) prices may be in the 20-25¢/lb. range soon. While this should make them more competitive with present products it's obvious that in the foreseeable future the Polectrons will remain special rather than general-purpose emulsions.

No Breakup in Makeup: One area where the Polectrons appear to have an edge over existing products is in their stability. According to Milton Freifeld and George Mack, of Annow

SODIUM Hydride

gives new dimension to ideas in organic chemistry!

An extremely useful and powerful condensing agent, you should be up to date on sodium hydride. Undoubtedly, MHI technical service can show you how to achieve new routes to the solution of frustrating organic alkalation and condensation problems. Getting acquainted with the latest technical literature would be a good start! It's available without obligation.

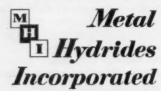
Did you know that sodium hydride is now marketed as a stable 50% dispersion in mineral oil? This gives it the appearance and handling characteristics of damp sand . . . makes it easy and completely safe to use, even in air. As you can imagine, this protective oil coating has given new breadth to sodium hydride's usefulness.

Important, too, are new prices . . . reductions of over 20% in the past year!

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are yours without obligation. And, so is the most authoritative technical service in the industry. *Shipped express collect

PIONEERS IN HYDRIDE CHEMISTRY



207 CONGRESS STREET BEVERLY, MASSACHUSETTS

SPECIALTIES

tara's Application & Research Service, tests at the company's central research labs indicate that the new copolymers are unaffected by a five-cycle freeze-thaw stability test, or by a one-hour run in a Waring Blendor. Concentrated hydrochloric acid or alum can be added without breaking emulsion, they add.

The Polectrons are not the first vinylpyrrolidone-incorporating copolymers
that Antara has marketed—the company has for years been selling a series
of solvent-based polyvinylpyrrolidonevinyl acetate copolymers for use as
hair spray resins. In addition Antara's published technical literature
going back some years mentions copolymerization of vinylpyrrolidone
with a long list of comonomers, such
as acrylic acid, methyl acrylate, acrylonitrile, isobutyl vinyl ether, maleic
anhydride, vinyl chloride and styrene.

None of these copolymers, however, are water emulsions. Instead, they're solvent-based materials calling for emulsion and bulk polymerization techniques—and, as a result, emulsion forms have been used infrequently.

New Process: The new copolymers are made by a "nonconventional" method of polymerization, a process developed by Marvin Leibowitz and Fred Grosser, of Antara. A patent is being sought on their procedure and Dalton is reluctant to give any of the details at this time. Once the company is more secure in its patent position, however, it will probably license the copolymer manufacturing to others.

Dalton says that the company now has about 15 different copolymers in various stages of development. The next products commercialized will likely be variations on the same basic comonomers. After that, will come comonomeric materials for those who want to synthesize their own copolymers.



Sealants Make a Snugger Prefab

A novel-and still not fully matured-market for specialty sealants and insulations is housed in a quaint prefabricated glass-fiber dwelling unit now being offered by a Detroit builder. The shelters, suggested as cabins, field offices, etc., were developed in Germany, are composed of segments that rely heavily on synthetic materials. Insulation, now supplied by Reichhold Chemicals, consists of a 0.5-in. Styrofoam layer, plus a 0.25in. polyurethane layer; U.S. licenser Milton Ratner says this is equal to a 12-in. brick wall. A vinyl fabric serves as the shelter's interior wall finish.

Glass-fiber weatherproof stripping, inlaid with a synthetic rubber seal, covers the exterior seams (segments are bolted together). The exterior can be painted; and the wall resin can be impregnated with color at the factory. Two models: the Pumpkin, 140-sq.ft. unit, and the Melon (see picture), a 440-sq.ft. unit, which can be enlarged by adding center sections. The manufacturer, International Enterprises Inc. (Detroit), says the price of the fully equipped Pumpkin (built-in cupboards and wardrobes and bathroom) is around \$2,500; the Melon sells for about \$5,000.



News from

National Carbon Company

Division of Union Carbide Corporation • 270 Park Avenue, New York 17, New York In Canada: Union Carbide Canada Limited, Toronto 12

National Carbon Design Engineers multiply your engineering staff



C. E. HULSWITT Design Engineer

Mr. Hulswitt, since becoming associated with National Carbon Company in 1956, has been instrumental in the design and development of an extensive variety of "Karbate" impervious graphite chemical process equipments.

One of the design areas in which Mr. Hulswitt has been particularly active is that of hydrogen chloride combustion, absorption, and stripping.

Mr. Hulswitt was graduated from Purdue University with a B.S. degree in Chemical Engineering.

New Catalog Section Describes "Karbate" Counterflow Block **Heat Exchanger**

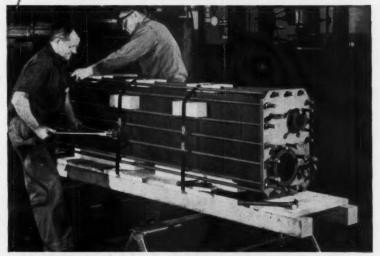
A detailed description of "Karbate" impervious graphite heat exchangers Type CFB is presented in a new, 8page Catalog Section-S-6813.

Information on this new, advanced-design, corrosion-resistant unit includes operating features, specification data on single and multi-pass models, construction and dimensional data, fluid flow patterns, pressure drop characteristics, and mounting methods. The catalog is fully illustrated with photographs, diagrams, and graphs.

Utilizing center blocks of impervious graphite, "Karbate" heat exchangers Type CFB provide the most versatile and dependable method of processing corrosive materials.

Write today for your copy of this timely, comprehensive publication. Ask for Catalog Section S-6813.

New "KARBATE" Condenser Type CFB on Way to Handle a **Highly Corrosive Application**



This new single-pass, three-pass unit is being prepared for shipment to a Midwestern chemical company for condensing an organic from an acid steam distillation operation. Fluids on both sides of 90 square feet of heat transfer surface contact "Karbate" impervious graphite only.

"Karbate" impervious graphite Type CFB is the newest cost-saving advancement in heat exchangers.

Measuring only 13 inches x 21 inches in cross-section, Type CFB (when mounted vertically) provides more heat transfer area per square foot of floor space than any other block type exchanger.

In addition to the unsurpassed corrosion resistance of "Karbate"

impervious graphite and the high thermal efficiency of true counterflow design, Type CFB permits maximum flexibility in change of heat transfer area. Center blocks, each 23 inches long, can be varied from 1 to 6 to provide a range of areas (for 3-pass unit) from 37.3 to 172.8 square feet. Single or multi-pass units give dependable operation at pressures up to 100 psi.

Other "Karbate" Equipment for **Chemical Processing Systems**

For incorporation in systems for the external heating or cooling of corrosive solutions used in plating, pickling, ano-dizing, and cleaning, "Karbate" imper-vious graphite is available in products and equipment such as: Pipe, fittings, and

valves . . . for long life, easy installation, minimum maintenance.

Centrifugal pumps...frame-mounted and motor-mounted... available in 22 models serving a wide capacity range, Other major items of "Karbate" impervious graphite include: Shell and tube

heat exchangers, HCl systems, absorbers, combustion chambers, entrainment separators, and cascade coolers.

"National", "Union Carbide", "N" and Shield Device and "Karbate" are registered trade-marks for products of

NATIONAL CARBON COMPANY



A GALLUP REPORT

Shows
More than 7 out of 10 women
want a triple-action
cleaner... and
Pine Oil does the job

The French say "Cherchez la femme"—("Seek out the woman" and you'll have the answer). We asked The Gallup Organization, Inc., to do just that in an effort to determine women's attitudes toward home cleaners. You'll find one of their interesting reactions detailed on the opposite page. It shows that 72% of all women interviewed wanted a triple-action cleaner. We can show you how Pine Oil fills the bill.

1.

CLEANING ACTION—"Ask a silly question, get a silly answer." We asked women what they wanted in a household cleaner. Of course they answered real cleaning action. As part of your formulation, Pine Oil adds a definite emulsifying action for better cleaning action. Pine Oil-based cleaners remove dirt . . . prevent its redepositing on the surface.



2.

DISINFECTANT—Today's women know that a clean *look* is not necessarily a sign of complete cleanliness. A cleaner with a high percentage of Pine Oil will kill germs of many communicable diseases. That's another reason for incorporating Pine Oil in your formulation.



3.

DEODORANT—Women want more than the knowledge that something is clean. They want a lingering pleasant fragrance that tells everyone else of their fastidiousness. Again Pine Oil fills the bill. A Gallup Survey reports that an overwhelming percentage of women favor the odor of pine.



Naval Stores Department

HERCULES POWDER COMPANY

Hercules Tower, 910 Market Street, Wilmington 99, Delaware

V

FOR FASTER DISPERSION





Faster Dispersions: Low-viscosity G-E Antifoam 60 disperses instantly, can easily be poured. You'll find it more convenient to use and faster-acting than other silicone defoamers.

Higher Concentration: General Electric Antifoam 60 comes to you in concentrated form (30% silicones) for easier handling and storage. You can use it as supplied, or reduce it with water to any desired concentration.

Greater Economy: Only a few parts per million are needed in most foaming systems, even less than with other silicone antifoams. And because such minute quantities are used, G-E Antifoam 60 will not affect the other properties of your process.

Write for a free test sample, specifying whether yours is an aqueous or non-aqueous system Section EE 432, Silicone Products Dept., Waterford, N. Y.



They All Come Out in the Wash

A wave of new products packaged in water-soluble film appears to be rolling into the consumer field. A host of companies are either readying new entries or more vigorously pushing existing items.

Some recent developments:

 Lever Bros. will shortly begin test marketing a laundry detergent in dissolving packets.

• Procter & Gamble, which began testing Tide Redi-Paks last summer, is reported to be increasing the number of its markets, is not far away from nationwide distribution. Look for P&G to put the same wrap on some of its other products if the Redi-Paks go over.

• Tidy House Products Co., newly acquired division of Pillsbury Co., has developed a detergent and bleach twin-pack product. It is not yet being retailed but is due in test markets soon.

Two other big soapers have adopted a wait-and-see policy. Colgate-Palmolive, in what the trade regarded as an unusually farsighted move, brought out a dissolving-pack laundry detergent, Swerl, last fall in the Charlotte, N.C., area, but has done little with the product since.

And Purex, which last year bought the rights to Toss, a product developed by Techno-Economics Services, isn't doing much with the product currently. Techno-Economics tested Toss in the San Francisco area prior to its sale to Purex, and it was apparently favorably received. Purex, however, reports no plans to market Toss in the near future, is waiting to see how P&G and Colgate do with their products.

Lestoil Breaks Ice: One of the first big companies to go into watersoluble film was Lestoil Products, Inc., which launched its Lestare dry bleach in '59. Lestoil remains the largest factor in the soluble-film field today, is now the nation's Number 1 seller of dry bleach.

In addition to the soapers mentioned a handful of small companies are now using the packaging material. Products include bubble bath, toilet bowl cleaner, household dye and a slimicide.

The laundry field seems to hold the biggest and most immediate potential for producers of the film. Starch and water softeners have also been considered possibilities. Other smaller markets expected to emerge include the packaging of agricultural chemicals, swimming pool additives, tints for vinyl-latex water-base paints, septic system conditioners, antirust agents for automotive cooling systems, industrial additives, photographic chemicals, bath powders and water-soluble rope.

At the moment the trade is watching P&G. If the giant soaper goes national this year with its Redi-Paks, the fence-sitters are expected to follow, increasing the consumption of soluble resin to 15 million lbs. in '62. (It is currently 3 million lbs.)

If some of the films can be cleared for human consumption by the Food & Drug Administration, poundage would get a giant boost from the frozen-food packaging industry.

Borden Out Front: Borden Chemical Co., with its Lemoflex, polyvinyl alcohol resin, is currently producing the bulk of the water-soluble resins used. For a while Borden had a competitor in Dow Chemical's Methocel, a methyl cellulose material (Dow was the original supplier for Lestare). But Dow quietly withdrew its resin from the market about two months ago because of difficulties with heat sealing and problems with water solubility at high temperatures. It will not say whether it might return.

A material heretofore in the developmental stage will soon be promoted commercially by Union Carbide's Visking Co. division. Hylox film, just getting into the picture now, is made from polyethylene oxide. How speedily it makes a mark depends on the growth of the field itself.

PRODUCTS

Liquid Herbicide: American Cyanamid Co. (New York) is marketing a new liquid herbicide, Cytrol, for control of quackgrass. Based on amitrol, the product is absorbed into the plant and kills both roots and tops. Packaged in 1-gal. and 5-gal. polyethylene containers, it is soluble in water and permits easy cleaning of spray equipment.

Carbon Paper Wax: Bareco Wax Co., division of Petrolite Corp. (Tulsa, a new



Piccotex

For whiter whites at lower pigmentation cost, use Piccotex, new permanently water-white neutral thermoplastic hydrocarbon resin. A copolymer of styrene homologues, Piccotex has excellent heat and color stability, and good resistance to water and alkali. It is hard and friable, available at 100°C and 120°C softening points, and in solution. Piccotex is soluble in most aromatic and aliphatic solvents. Among its outstanding properties are these:

IODINE NUMBER—Less than one SAPONIFICATION NUMBER—Less than one ACID VALUE—Less than one

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Whether you're feeding floodable carbon (smoke) or free flowing granular carbon, organic or mineral carbon, B-I-F's totally enclosed feeding systems provide automatic, continuous control of the flow of this hard-to-handle material . . . at high accuracy. Regardless of material characteristics or process conditions, B-I-F has the performance-proved, engineered system for more efficient carbon feeding.

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BUILDERS-PROVIDENCE • PROPORTIONEERS • OMEGA 406 MARRIS AVENUE, PROVIDENCE 1, RHODE ISLAND Okla.), has developed a deodorized microcrystalline synthetic wax, Petrolite WB-7, for use with carbon paper inks. Inks made with the new wax, besides being relatively odorless, have good dye solubility, oil retention, carbon dispersion and hardness.

New Propellant Mix: Du Pont (Wilmington, Del.) has come up with a new propellant formulation containing a special stabilizer that will prevent aerosol container corrosion previously caused by the reaction of propellant with anhydrous ethyl alcohol. Freon-11 S is regular Freon-11 plus a small amount of stabilizing agent. It is believed to be compatible with most nonpharmaceutical aerosol products.

Three for Nitrogen: Hercules Powder Co. (Wilmington, Del.) has made available the first three of a line of urea-formaldehyde concentrates. UFC 7626, 7147, and 8545 are designed for the economical manufacture of urea-formaldehyde resins to be used in plywood adhesives, furniture, paper, and textile and protective coatings.

New Field for GAF: Collway Pigments Division of General Aniline & Film Corp. (New York) is entering the nonionic pigment dispersion field with a line of free-flowing nonionic water dispersions for simplified latex emulsion paint formulations. Ten shades will be available for application in latex paints, latex-backed carpeting, vinyl-backed furniture fabrics, and the coloring of nonwoven fabrics.

Plasticizer-Stabilizer: Rohm & Haas Co. (Philadelphia) is marketing a stabilizing low-temperature plasticizer for polyvinyl chloride. A monomeric epoxy-ester, Monoplex S-74 was developed to provide decreased volatility while maintaining low-temperature flexibility and ability to stabilize PVC against effects of heat and light.

Dimer Acid: Emery Industries, Inc. (Cincinnati, O.), has developed a light-color commercial-grade dimer acid. Empol 1018 is designed primarily for polymers and has an 8-max. Gardner color, good color stability, and low monobasic acid content.

Carbide Resin-Hardener: Union Carbide Plastics Co. (New York) has made commercially available a new resin-hardener combination designed to produce both hot- and warm-coated sand for shell molds and cores. Bakelite phenolic resin BRL-5009 is waterborne and nonflammable; phenolic hardener BRP-0314 was developed especially for use with it.

FDA-Approved: Carlisle Chemical Works, Inc. (Reading, O.), is marketing dilauryl thiodipropionate, an antioxidant and stabilizer for polypropylene, polyethylene and fats and oils. It has been approved for use by the Food and Drug Administration, is suggested as a food and food-packaging antioxidant for edible fats, oils and animal feeds. Three grades are available.

Acid Inhibitor: Armour Industrial Chemical Co. (Chicago) is selling a new acid inhibitor for sulfuric, sulfamic, phosphoric or citric acids to be used in metal cleaning and pickling. Armohib 31, a 100% active compound, is an aliphatic nitrogen-containing product. It is soluble in acid at use concentration and will not precipitate or cloud. The inhibitor is said to be nonstaining and free from objectionable odors.

Paint Stabilizer: The Borden Chemical Co. (New York) has developed a new paint stabilizer and thickener said to have improved pigment dispersion and leveling qualities. Protovac PV-432 is designed for use with polyvinyl acetate and other alkaline water-based vehicles, also is a protective colloid. It's supplied in dry powder form, packaged in 100-lb. drums, and has a year's storage life.

Ceramic Adhesive: Melpar, Inc. (Falls Church, Va.), has developed a new high-temperature ceramic adhesive, Melbond CA-100. It is reported to have superior bonding strength when used with refractory materials such as ceramics and to possess a maximum service temperature of 2600 F after being cured at 250 F.

Glass Coating: Bradley & Vrooman Co.'s (2629 South Dearborn St., Chicago) new one-coat spray-applied coating for glass requires no surface pretreatment. It's said to provide a finish that's resistant to impact and chemicals. Tradename: Sterikote 600.

U.S.I. CHEMICAL NEWS

April 22

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

19

U.S.I. TO BUILD PLANT FOR LINEAR POLYETHYLENE AT HOUSTON, TEXAS

Soviets Sign Agreement With N. Y. Publisher on Scientific Translations

A contract for the exclusive, worldwide English language rights to Soviet scientific books for the next six years has been signed by the official Soviet book export agency and Consultants Bureau, a New York publisher.

The books covered include important Soviet symposia, monographs, conference proceedings and collections, all on highly specialized scientific and technical subjects. The contract should result in muchimproved communications between Soviet and American scientists.

Earlier in 1960, Consultants Bureau obtained exclusive rights to translate 23 major Soviet journals in the fields of chemistry, physics, biology, medicine.

All books published by Consultants Bureau will, in the future, be made available to English-speaking scientists within six months of their publication in the USSR. Where the importance of Soviet conferences warrants even speedier dissemination of their proceedings, Consultants Bureau will publish English translations at the same time as the Russian originals appear in the USSR.

New Technique Prevents Hydrogen Embrittlement of Tantalum in CPI Equipment

Tantalum metal can be easily protected against hydrogen embrittlement via a technique developed recently. The method consists of affixing to the tantalum a small piece of platinum. The platinum is reported to protect an area 10,000 times larger than itself for over 1,000 hours.

Tantalum is a corrosion resistant metal with excellent high temperature properties. It has shown great promise as a

U.S.I. will begin construction this Spring of a 60 million pound-per-year linear polyethylene plant at Houston, Texas, adjacent to the company's conventional polyethylene facilities. The new plant, which will mark U.S.I.'s entry into the manufacture of linear polyethylene, is scheduled for completion in the fourth quarter of 1962.

New Facility Will Have Annual Capacity of 60 Million Pounds

Zirconium Crucibles
Pinch-Hit for Platinum



(Photo courtesy Fisher Scientific Company)

Solid zirconium crucibles, currently only 1/6th the price of platinum, are now available for laboratory use. According to a recent report, the new crucibles permit budget-conscious labs to make large numbers of peroxide and carbonate fusions without investing in costly platinumware.

With normal care, the new crucibles are said to last for at least 100 sodium peroxide fusions at 460°C. They can be used at temperatures up to 900°C, for sodium and potassium carbonate fusions, preferably in the reducing atmosphere of a burner flame rather than in a furnace.

Nickel, iron or porcelain crucibles present the problem of sample contamination by material dissolving from their walls. With zirconium, however, it is reported that after 20 to 50 peroxide fusions, only 0.1%-2% per fusion is lost,

Recently there has been considerable discussion about over-capacity in the linear polyethylene field. Dr. Robert Hulse, general manager of U.S.I., states: "We would not be building this important new plant if we did not believe that over-capacity is a short-term problem and that linear polyethylene is growing in importance. Every market projection we have made indicates that this versatile plastic will be in short supply by early

PETROTHENE® Trade Name to Be Used

The new U.S.I. plant, designed for easy expansion, will be managed by the same people who are now running the low and medium density polyethylene plant at Houston. The linear polyethylene will be manufactured under a licensing agreement with Phillips Petroleum Company, and will be sold under U.S.I.'s trade name, "PETROTHENE®" polyethylene resin.

Linear polyethylene is stronger and more rigid than the conventional type. It

MORE

Polyethylene Mulch Film Improves Vegetable Yields

Polyethylene mulch film has increased test vegetable yields as much as 100%, according to findings of the Oregon (Corvallis) and South Dakota (Brookings) State College Agricultural Experiment Stations reported by James P. Menn, U.S.I.'s Staff Agronomist at the 73rd Annual Meeting of the Florida State Horticultural Society.

Corvallis tests on tomatoes resulted in a marketable yield of over 20 tons per acre with polyethylene mulch and about

10 tons per acre without mulch. Other Corvallis tests showed increased pole bean

MORE

April 22

U.S.I. CHEMICAL NEWS

1961

CONTINUED

Polyethylene Mulch Film

and cantaloupe yields also. Tests at Brookings indicated significant yield increases for sweet corn, snap beans, carrots, cabbage and cucumbers.

Polyethylene film is said to be particularly well suited for use as mulch. Its physical properties can be varied to raise or lower soil temperatures, conserve soil moisture, control weeds and plant diseases. It is highly impermeable to water vapor. Its use often results, not only in early crop set and harvest, but also in increased marketable yields which more than justify its cost.

Polyethylene mulch is available commercially as a durable, flexible, lightweight black film. Special-purpose whitepigmented and colored polyethylene mulch films are now being researched.

Current interest is indicated by the fact that some 33 land grant colleges are carrying on, or have completed, research projects on plastic mulch materials. However, it is reported that if such materials are to become widely used, more study will be needed on improving application equipment.

A copy of Mr. Menn's paper is available from U.S.I.



The plant at left was grown with polyethylene mulch film, the one at right without. Note healthier look, greater yield.

CONTINUED

Tantalum

material of construction for the chemical process industries. However, use of tantalum has been limited in certain applications because it is subject to stress cracking and failure due to hydrogen ion absorption into the metal lattice. In tests over the past three years, small platinum spots riveted or spot welded to tantalum have protected the latter metal from concentrated hydrochloric acid at 374°F. for over 1,000 hours. By contrast, unprotected tantalum becomes brittle in a few

Tantalum's rate of corrosion is not increased by contact with the platinum, it is reported. In fact, in some cases, it is decreased. At the same time, the platinum's rate of corrosion, usually high in concentrated hydrochloric at high temperatures, is decreased to almost zero.

It is felt that the new development will greatly increase the utilization of tantalum metal for chemical plant equipment.

CONTINUED

Linear Polyethylene

is widely used for blow-molded bottles and containers for industrial products, detergents and other household staples. Other growing markets include injection molded items such as toys and housewares; extruded pipe; and film for heavy duty bags and similar products.

Company Makes Wide Range of Resins

U.S.I. facilities for conventional polyethylene have a rated capacity of 300 million pounds annually. The company currently produces some 100 types of 36 basic low and medium density resins at plants in Houston and Tuscola, Ill. Linear resins are also currently available from U.S.I. pilot plant facilities and through resale arrangements.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Plastic laboratory ware is subject of new catalog which includes many items not previously available in plastic, such as Buchner-type filter funnels and 125 ml. Erlenmeyer flasks. Special section on polyethylene properties.

Color-coating of all types of metals in single treatment is now claimed possible with new chemical surface treating process now ready for commercial application. New coatings can be clear or colored; are reported color-fast, corro-sion-resistant, easy to apply. No. 1701

K-t-butyl alcoholate now available in pilot plant quantities. Is essentially alcohol-free. Said to have found wide use as catalyst in base-cata-lyzed reactions on research scale. No. 1702

New line of metering pumps for drums and pails has just been introduced. Pump for 5- and 6-gallon pails is self-priming, dispenses 4 oz. per stroke.

No. 1703

Metal cleaner now on market is formulated to remove build-up of iron and nickel oxides from tanks, lines, nozzles, fittings in sulfuric acid or nickel sulfate service. Said to be non-luming, weakly acidic.

Four new instrumentation systems, based on nu-clear methods, have been developed for continu-ous measurement and control of moisture and density of materials on conveyor belts and in pipes, bins, hoppers, tanks, mixers, blenders.

Cryogenic ball valves now on market handle hydrogen, oxygen, helium, nitrogen—as liquids. Vacuum-jacketed types furnished when extreme low-temperature storage with minimum heat leak is required. Claimed extremely tight-sealing. No. 1706

New foaming agent for use in air drilling of oil wells beset by water encroachment is said to produce large quantities of stable, light-density foam and to be unaffected by high concentrations of dissolved solids.

No. 1707.

New spray gun for applying heavy thickness floor coatings said to give smooth, even coat of catalyzed coatings mixed with filers such as silica and aluminum oxide. Coatings can be sprayed from 1/16 in. up to any thickness.

Interchangeable type system for typewriters, now on market, allows use of about 400 characters not on standard typewriter, without installing new type keys. Includes chemical and mathematical symbols, Greek letters, subscript and superscript numbers.

PRODUCTS OF

PETROTHENE R . . . Polyothylene Resins

MICROTHENE . . . Finely Divided Polyethylene Resin.

Organic Selvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, DIATOL®, Ethyl Ether, Acetone, Ethyl Chloroformate, Ethylene, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate).

Phermaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

Ethyl Alcohol: Pure and all denatured formulas; Anhydrous and Regular Proprietory Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL®M, ANSOL®M

Heavy Chemicals: Metallic Sodium, Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Ferlilizer Solutions, Phosphatic Ferlilizer Solution, Suffuric Acid, Castic Soda, Chlorine, Sodium Peroxide.

Animal Feed Products: DL-Methionine, MOREA® Premix (to authorized mixer-

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Technology

Newsletter

CHEMICAL WEEK April 22, 1961 Licensing news and pilot-plant activity on processes for separating lignin and xylenes:

- Crown Zellerbach Corp. (San Francisco) has signed an option agreement for exclusive U. S. and Canadian rights to hydrogenation of lignin in spent wood-pulp liquors. The process was developed by Noguchi Institute of Tokyo, which has been operating a small pilot plant for two years and is now building one with 2,200-lbs./day capacity. The idea is to separate lignin, largely a waste product, into useful chemicals. Products of the process include a number of phenolic compounds and neutral oils. It's suitable for lignin in either sulfite or kraft liquors or the material left over after hydrolyzing wood to produce sugars.
- Union Oil (Los Angeles) has licensed its Clthration process to an unidentified customer for separating xylene isomers. The licensee is building a semiworks unit, will use the process to make meta-xylene. Capacity is not known but is believed to be less than 10 million lbs./year. The idea, researched by Union since the early '50's, essentially involves trapping a molecule of certain configuration and excluding those with different configurations. In xylene separation it could be used to trap one isomer. Normally, m-xylene is separated out by fractional crystallization.

Latest company in filament winding to establish completely integrated engineering and production units is B. F. Goodrich (Akron). Like most of the other producers, it will direct its effort toward fabricating high-strength, lightweight structures, such as rocket motor casings, for the aircraft and missile industry (CW, April 8, p. 51).

However, Goodrich claims it is the only maker of rocket motor casings that can produce the complete structure—including the rubber or plastic insulator for the glass filament-wound chamber—at one location. Goodrich, which began investigating the field in '44, has developed its own winding equipment and winding technique. Called the "biaxial" method, it's for use in producing irregular as well as cylindrical shaped vessels.

Another new filament-winding machine has been developed by Telecomputing Corp.'s Narmco Research & Development Division (Los Angeles). Narmco says the new unit is "completely universal," can produce a variety of shapes. Heretofore, each basic shape required a different machine.

"Scintillating resins" that can detect extremely small quantities of radioisotopes are under development at Tracerlab's Richmond, Calif., laboratory. By combining a scintillation phosphor with an ion-exchange resin, Tracerlab hopes to come up with a low-cost method of detecting trace amounts of isotopes (e.g., strontium in drinking water). Idea is that the resin would concentrate the isotope enough to be detected by the

Technology

Newsletter

(Continued)

phosphor. The Atomic Energy Commission has awarded Tracerlab a \$46,-000 contract for the study.

Heavier feedstocks for ethylene production is shaping up as a significant move by some big producers in the Southwest. The long-term trend is to use lighter feedstocks (particularly ethylene from natural gas processing plants). But unique positions are causing some companies to run counter to it.

Monsanto, for instance, is switching from an all-LPG feed at its Texas City, Tex., ethylene plant to a mixture of LPG and light distillates. At its planned Chocolate Bayou, La., ethylene unit, it will use heavier feeds, too, such as high-gravity crude oils, distillates, gas-oils and condensates. And Mobil Chemical will feed naphthas and similar materials to its Beaumont plant.

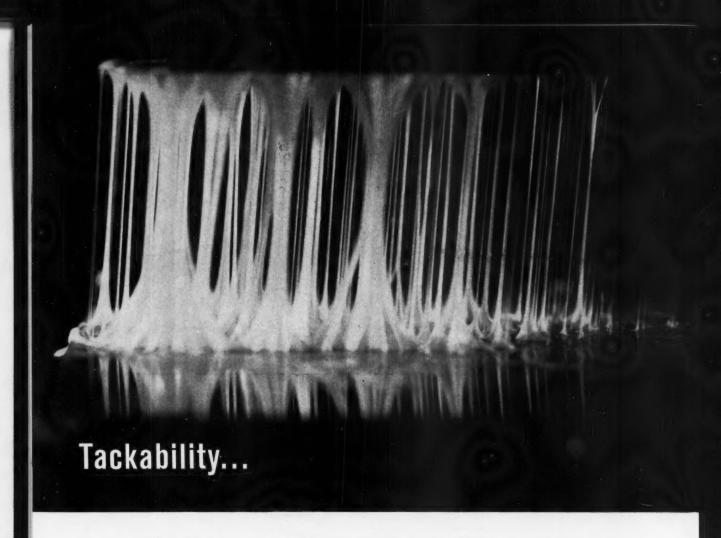
These fractions are C_{δ} and higher compounds from the natural gasoline fraction of natural gas liquids, from oil fields producing very lightweight crudes, and from refineries. Normally they're blended into gasoline. But then the refiner has to upgrade them by some additional steps, such as reforming. Moreover, there's more than enough gasoline being made and refiners prefer an alternate use.

A disadvantage of the use of the heavier materials: they involve production of more by-products—mainly propylene, butadiene, amylenes, isoprene and some light oils. This presents problems to refiners or other companies making ethylene with no captive markets for the by-products. For companies such as Monsanto, Union Carbide, Humble, which either use these products or sell them, this could actually be an incentive to use the heavier hydrocarbons.

Another hydrodealkylation process has found gainful employment. The first commercial unit to use the HDA process, developed by Atlantic Refining and Hydrocarbon Research, will be in a new refinery in Argentina for Yacimientos Petroliferous Fiscales at San Lorenzo, about 200 miles northwest of Buenos Aires. All other major hydrodealkylation processes are now either in operation or being engineered in commercial units (CW, March 4, p. 46).

The HDA process, a thermal method, will be used to make benzene from toluene. It's thought to be the only licensed commercial thermal process. It is not known whether Sun's process is thermal or catalytic. Sun, incidentally, is breaking ground for its \$8-million hydrodealkylation unit for naphthalene.

Blending of petroleum products by electronic control began last week when Union Oil Co. (Los Angeles) put its \$1.5-million computer-controller system into operation. It can blend as many as 10 gasoline stocks with five additives and tetraethyl lead to produce up to 5,000 bbls./hour of finished gasoline. Patents are pending on this and a companion unit, which blends turbine and diesel fuels at rates up to 3,500 bbls./hour.



Nevillac makes adhesives more tenacious

Prominent among the attributes which make Nevillac, Neville Chemical Company's line of hydroxy resins, a valuable addition to adhesive formulation is its inherent tackifying ability. When correctly compounded, it improves surface adhesion, promotes quick initial grab and improves bond strength. It literally makes adhesives more tenacious.

But there are other excellent reasons for including the Nevillac resins in your formulations. They are so highly compatible and soluble with a host of other materials that they act as an agent in bringing together other materials which are normally incompatible. This co-compatibilizing and

natural solubilizing ability pertains to their use with most elastomers, plasticizers, and other resins. The Nevillac resins can lower the molten viscosity of many adhesive formulations and accentuate resistance to water, acids and alkali. They also possess generally good light stability, permanent thermoplasticity and ease of emulsification. If you formulate cold cut, hot melt, or latex blended adhesives, it will pay you to investigate further. Write for Technical Service Bulletins Number 72 and 75.

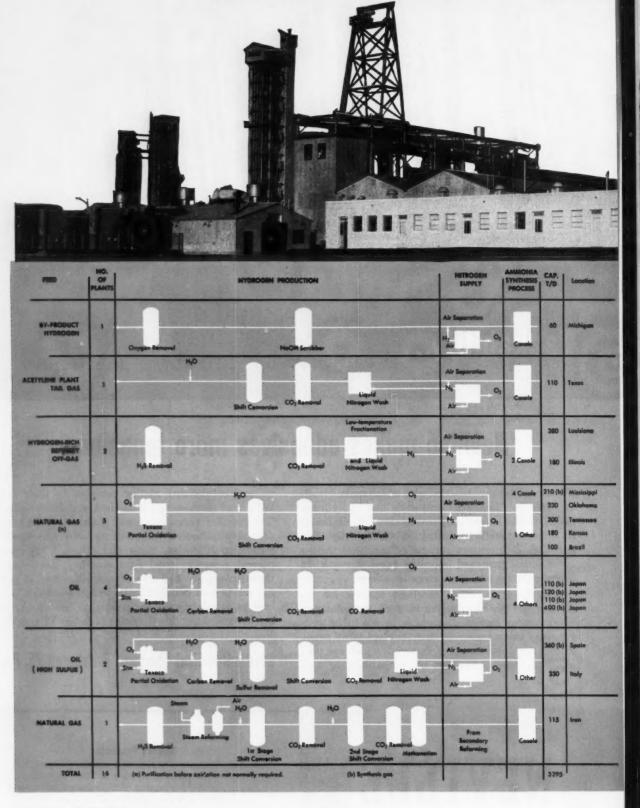
Neville Chemical Company, Pittsburgh 25, Pa.



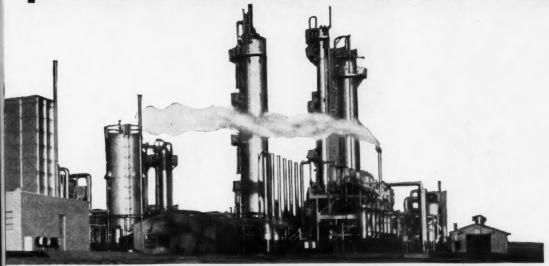
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Resins—Coumarone-Indene, Hydrocarbon (Thermoplastic and Heat Reactive), Hydroxy • Oils — Plasticizing, Neutral, Rubber Reclaiming, Shingle Stain • Solvents—Aromatic (Refined and Crude), Semi-Aromatic (Refined and Crude). • Antioxidants—Non-Staining Rubber • High Purity Indene.

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More than one million tons per year ammonia capacity has been built or is under contract by Foster Wheeler. Eight Foster Wheeler plants account for 20% of the tremendous increase in the production of ammonia in the United States over the last decade. The table at left provides a brief view of FW's process flexibility and worldwide experience.

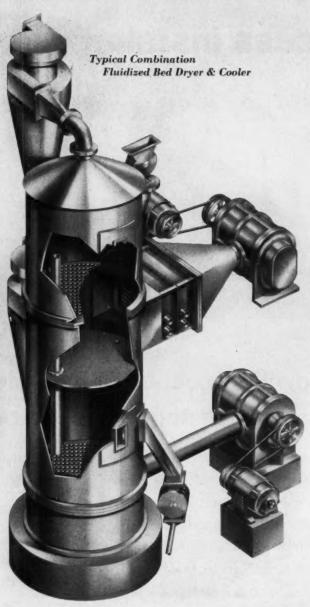
The most recently completed FW ammonia plant exceeded rated capacity within one month of start-up. Economic production over a wide range of outputs has been realized. From plants of modest size, to those in the higher capacity ranges, these Foster Wheeler ammonia plants turn in exceptional performances.

Foster Wheeler has also designed and constructed two of the largest urea plants in the United States. Both use the Pechinev-Grace process featuring total recycle and produce urea of superior quality and color. To get information on the ways Foster Wheeler process experience can serve you, write to Foster Wheeler Corporation, 666 Fifth Avenue, New York 19, New York.

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YOU'LL FIND NO "HOT SPOTS" IN LOUISVILLE **FLUIDIZED BED EQUIPMENT**

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that for all practical purposes are isothermal.

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For more information about Louisville Fluidized Bed Equipment, please write for Bulletin FBD-61

CORPORATION

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Monthly meeting gives Scientific Design's executives forum for airing new-project ideas.

Process Merchants on World Scale

The group above brainstorming for new research ideas, are executives of Scientific Design Co., Inc., who gathered last week for the firm's monthly research meeting at company headquarters in New York. Evident at these meetings is the philosophy of SD: to select for research only those projects that will lead to a process attractive to potential customers for licensing.

How successful this philosophy has proved is indicated by the company's record. To date, SD has built:

• 20 ethylene oxide plants for 14 firms in eight countries, accounting for nearly one-third of world ethylene oxide capacity, about 700 million lbs. year.

• 19 maleic anhydride plants for 17 firms in eight countries, two-thirds of world maleic anhydride capacity, about 250 million lbs. year.

• 10 polyvinyl chloride plants for eight firms in the U.S., about onethird of U.S. capacity.

And the company has shown con-

siderable physical growth as well. In '53, when the young firm—it recently celebrated its 15th anniversary—was at the half-way point in its career, it employed 200. Today it employs over 700. Prior to '53 SD had built three plants, licensed three processes. To date, the company has built 90 plants, based on some 25 processes, mostly its own.

Moreover the company's philosophy has changed somewhat since '53. At that time SD thought it was large enough, did not handle its own construction work and was searching to find a unique position in the engineering field (CW, Dec. 19, '53, p. 36).

Today, in contrast, the firm is expanding rapidly, handles construction work, manufactures its own catalysts and believes it has found its place as an engineering company specializing in independent research on organic chemical processes.

The firm is still privately owned and directed by Harry Rehnberg,

Landau picks ideas for SD's research money





SD's David Brown, R&D vice-president; T. P. Brown, senior vice-president; J. Russell, research director.

president, and Ralph Landau, executive vice-president. It's estimated that the company's total volume of engineering and construction business is now \$60-75 million/year.

Road to Riches: SD's route to major status in the engineering field is typical of a handful of other firms. Chemical Construction Co., Hydrocarbon Research, Inc., Houdry Process Corp., M. W. Kellogg and Universal Oil Products are among the companies that followed the process development and licensing route.

Even in this group, however, SD believes it is unique in the field of organic chemical process development. And the firm acknowledges that it receives substantial royalty income from its licenses, income it regularly reinvests in researching and developing new processes. This growth policy has brought the company to the point where it is currently building an average of 20 new plants yearly and developing three new commercial processes each year.

Such a process development record is probably better than that achieved by most U.S. chemical firms. And it has proved the key to SD's growth.

But research dollars alone, point out SD executives, can never be the key to success if they're not aimed in the right direction. The trick is to select projects that will pay off.

This is where the monthly research

meetings fit in. Attended by SD's research, engineering, sales and management personnel, they're presided over by David Brown, vice-president of Research and Development (see picture, above). At these meetings, members report on research progress within the company, discuss new development, suggest new ideas for future projects. Landau eventually makes the decision on whether an idea is good enough to warrant spending research money to develop it further.

Idea Flowsheet: Once an idea is approved for research it's turned over to the research and development department, which is made up of about 100 chemists and chemical engineers. The research laboratory group is composed of five sections: (1) exploratory research, (2) projects research, (3) pilot plants, (4) analytical research, (5) facilities maintenance.

Chances are that a new project will fall first into the Iap of exploratory research, which determines whether an idea is chemically feasible.

The projects research group takes chemically feasible ideas and tries them out in a process sequence. It makes preliminary process calculations and economic estimates to find the most practicable system. It puts this system into a simplified flowsheet and, if pilot planting is necessary, sends it to the pilot-plant group. SD tries to avoid full-scale pilot-plant

studies, however. It either develops bench-scale plants or bypasses them completely to cut down costs.

When the embryonic process has cleared exploratory, project and pilot-plant research, it's turned over to the engineering development department. Here mathematicians and statisticians work out statistical control of the experiments performed and study details of unit operation such as reaction kinetics and complicated multicomponent distillation systems.

Finally, the process development prepares economic studies on the finished process to establish whether it's ready for sale. If not, it recommends the best alternatives before the idea leaves the research and development department and goes into engineering development.

Own Best Customer: Engineering a plant at Scientific Design has much in common with engineering a plant anywhere: each project must move through process design, mechanical and material specifications, general engineering design, procurement and construction.

However, SD's engineering department operates differently than most engineering firms in that its own research is the engineering department's customer; 75% of the projects handled are for SD processes. (The other 25% is devoted to work on scaling

up customers' processes to full-scale plants.) Bulk of engineering at other firms is on outside processes.

Since SD carries a basic licensor's responsibility for those plants using its own process, its engineering division takes on an unusual characterstic. The sections most unlike those in conventional engineering companies are: (1) project evaluation, (2) project management, (3) project organization, and (4) startup operations.

Project Evaluation: At SD the project development group is basically similar to the estimating section carried by some contractors, who pull together a specialized group of process engineers, project engineers and estimating engineers for preparing proposals. However, the emphasis at SD is different: many of the projects (SD processes) must be analyzed for alternate routes and conditions to set process guarantees.

SD's project development section handles all projects. It calculates process flow diagrams showing heat and material balances and mode of control; it develops engineering flow diagrams showing all process piping, valves and detailed instrumentation; and it often prepares specifications for the major items of equipment. These engineering data are used for definitive cost estimates and preparation of proposals.

Project Management: Although the project development section's estimates are used for bidding, its calculations are not used as the final calculations for actual design. Its bid estimates are modified to serve as control estimates in scheduling actual projects.

This is where the firms special approach to project management comes in. The project managers combine both the skills of the process engineer and the project administrator. They check all of the chemical engineering calculations for process design, make alterations to fit the client's requirements, then follow the project. In some cases they supervise other engineering groups and procurement until it enters into construction.

Project Organization: The project manager normally has two styles of organization to choose from: either the task-force or the production-line system.

The task-force system assigns engineers and draftsmen full-time to a

project as needed, sometimes carrying this as far as physical location, where empty drafting tables and desks are set aside for men to move into as a project grows into its peak work load. In contrast, the production-line system uses a number of specialized departments through which several projects can be administered simultaneously.

Almost all engineering firms line themselves up with one or another of these two systems, with those specializing in large refinery projects usually choosing the production line and those specializing in chemical plants choosing the task force. Those preferring production-line organizations claim it is more efficient, allows higher skills among the specialized engineers; those preferring the task force say it gives a better plant through closer cooperation in the design work.

Unlike most firms, SD uses both systems, depending on the project, so that its project managers must be prepared to lead their plant through a task force or administer it through specialized sections.

Startup Operations: Long before an SD project manager moves his project into construction, he will have run head-on into the startup department, another special group. Since the firm specializes in complete plant projects and assumes total responsibility for a satisfactorily operating plant, the startup department must represent the viewpoint of the client's operators in a majority of projects. Every project must have its engineering flow diagrams approved by the startup section before it moves into construction. Including 25-35 men the startup department is staffed entirely with engineers drawn from SD's research and engineering groups, as well as trained full-time startup chief operators.

Keeping Current: To keep pace with new developments, SD maintains close touch with the world chemical industry. All firms, of course, encourage their personnel to keep up with the times, but SD has organized this philosophy into systematic procedures. Example: the Ethylene Oxide Club, composed of licensees of the SD process. The club convenes periodically, has met once in Linden, N.J., once in Europe, and just last week in Houston and New York City.

Plants using processes licensed by Scientific Design include:

antibiotics perchloroethylene chlorophthalic methanes anhydride citric acid polyethylene (Agfo process) cumene (Mid- polyvinyl Century chloride process) monovinyl ethylene chloride purification ethylene adipic acid oxide ethanolamines ethylene glycol isoprene fumaric acid (with Goodyear) terephthalic epichloroacid (M-C hydrin process) maleic anhydride

Other processes handled by SD include:

acetaldehyde phenol acetic acid styrene acetone sulfur methyl ethyl vinyl acetate ketone carbon tetra- vinylidene chloride chloride cyclohexanol caprolactum O-xylene & cyclohexanone P-xylene dibutyl & ethylene dioctyl phthalate ethanol polybutadiene ethyl benzene polyisoprene ethyl chloride glycerin ethylene trimellitic dichloride and others isopropyl alcohol



ENGINEERING

What's Ahead: Already international in scope, SD expects its future growth to continue on an international scale, with big expansions overseas. The firm currently operates complete engineering and design offices in France and in England; and it has technical representatives all over the world. Research activities, however, are expected to remain U.S. based, so that foreign expansions will generally be limited to engineering and technical liaison activities.

Continuous Bleaching

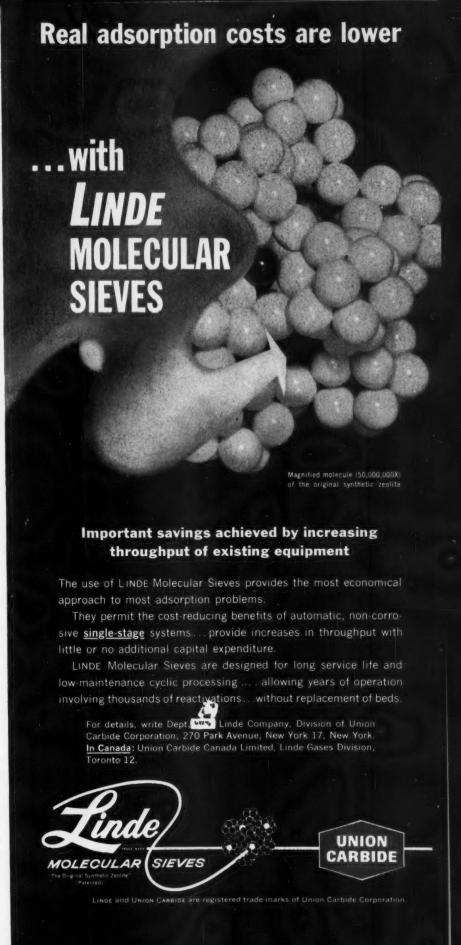
A new continuous bleaching process, claimed to reduce natural and synthetic fiber manufacturing costs up to 40% has been developed by Olin Mathieson Chemical Corp. (New York). The process makes use of Olin's sodium chlorite product, Textone, requires little modification of conventional peroxide bleaching equipment. Textone costs 1-3¢/lb. less than peroxide and only 60-80% as much is used. Process detail will not be revealed until patents are granted.

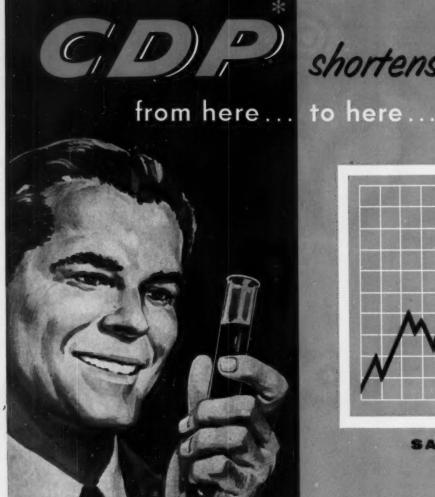
Feeding Fuel Oil

Last week Dominion Foundries and Steel Co., Ltd. (Hamilton, Ont.) described fully for the first time its results of injecting heavy oil with air into commercial blast furnaces (CW Technology Newsletter, March 11). The fuel oil is used to raise the maximum temperature at which the air blast can be shot into the furnace, resulting in a saving on coke consumption via heat economy.

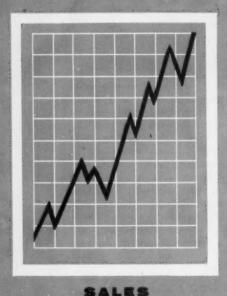
The furnace used in the test was Dofasco's No. 3 blast furnace, which was started up in Aug. '60. This furnace has a hearth 22 ft., 3 in. in diameter, uses 14 tuyeres for the air blast. Oil injection equipment, designed to offer little interference to furnace activity, was installed at each tuyere. Although an individual oil-to-air proportioning system was available for each tuyere, it was, however, found as unnecessary.

One bonus of the test showed that oil injection offers a new tool for controlling the furnace. It can vary the fuel input directly to the working zone (rather than waiting for the feed to descend from the top); it can vary the rate at which the stock inside the





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furnace descends, since the oil reduces the amount of coke consumed; and it can raise or lower the furnace hearth temperature by using the fuel or quench value of the oil.

Originally, the furnace was run on about 840 gal./hour (about 0.4 bbl. of oil per ton of iron produced). It's currently operating on 960 gal./hour; and plans are to push it up to 1,800 gal./hour.

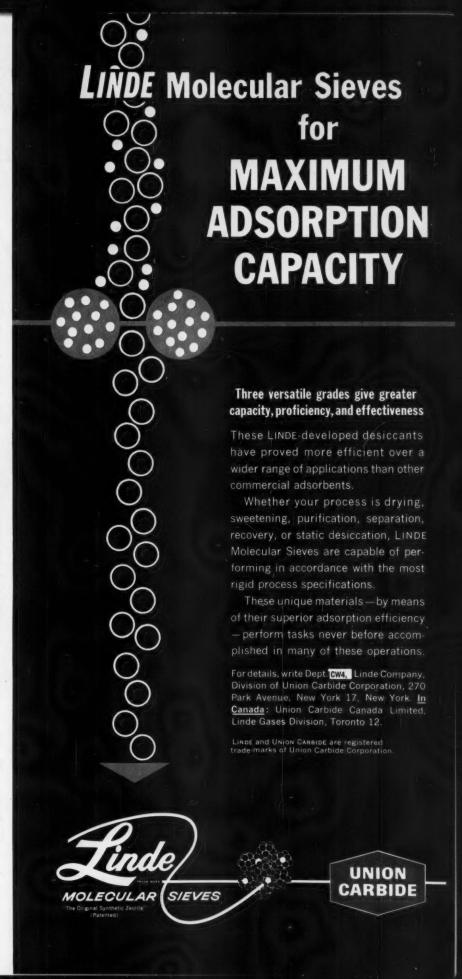
PROCESSES

Sludge Removal: The city of Toledo, is now testing a novel two-stage watersludge-concentration system. Air is dissolved under pressure in sewage. The air bubbles float to the surface along with the sludge, which is skimmed off. At the same time, the sludge concentration is being measured with a radioactive density meter; water is flowed out under the sludge and the solid wastes are disposed of in heated biological digestion tanks. This technique, which could be adapted to industrial applications, is said to use less heat to maintain digestion temperatures than one-stage systems.

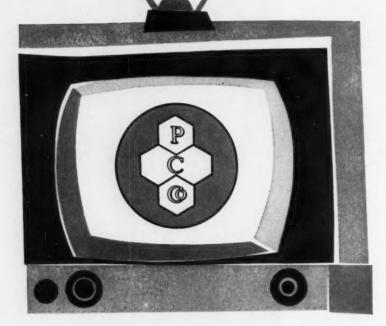
Beryllium Counter: Beryllium prospectors are getting help from a novel type of radiation gauge called the Berylometer. The device was developed by Nuclear Enterprises, Ltd. (Winnepeg, Can.), and distributed through Research Chemicals Division of Nuclear Corp. of America (Burbank, Calif.). The detector shoots gamma rays into an ore sample, causing any beryllium present to give off neutrons to a degree that indicates quantity of the desired mineral present.

Semihydrate Phosphoric: A new wet-process phosphoric acid process, developed by Nissan Chemical Industries Ltd. (Tokyo), is claimed to yield as high as 97% of the phosphate value in phosphate rock. Conventional yields are 94%. Another benefit from the new process is the high-quality gypsum by-product; it's said to be suitable for wall board.

The semihydrate process, as differentiated from the usual dihydrate process, is carried out in two stages: digestion and then crystallization. Close temperature and chemical control in the several hours of crystallization accounts for the quality of gyp sum. Negotiations for licensing rights are now reaching conclusion between



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86 CHEMICAL WEEK April 22, 1961

ENGINEERING

Nissan and the International Fertilizer Development Corp. (New York), a new affiliation of International Ore & Fertilizer Corp.

Polymerizing Furfuryl Alcohol: A new process for polymerizing furfuryl alcohol is claimed to be simple, produce monomer-free polymer, and to remove 13-16% of the water split out during processing. Armour Research Foundation scientist Eric Nielsen developed the process, which yields polymers with viscosities ranging from 300-300,000 centipoises, at competitive cost.

Furfuryl alcohol is boiled and the vapors passed through an activated alumina catalyst bed. The polymer is tapped off as liquid from a zone near the bed. Next, in a distillation column, water and the monomer, having lower boiling points than the polymers, rise to the top of the column where they condense. The monomer floats on water and is reboiled, and the water can be tapped off the bottom of the boiler as needed.

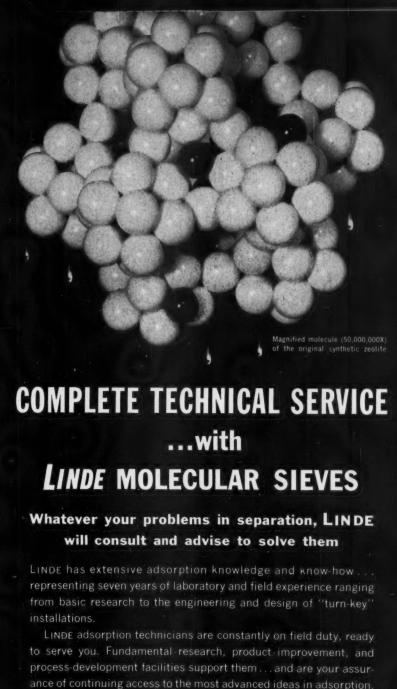
Nielsen has a patent (U.S. No. 2,681,896, issued in '54) on an older version of the process, and the alcohol and catalyst were in contact. He is currently seeking a patent on his new process.

Pyrite-to-Acid: Montecatini is starting construction this month of a plant at Follonica, Italy, that will use pyrites in a novel process to yield 350,000 tons/year of concentrated sulfuric acid. As by-product, about 170,000 tons of 65% enriched iron ore will be produced.

Key to the process: oxygen roasting furnaces that can drive the sulfur out of the pyrites leaving the iron as oxide. As oxygen replaces the sulfur in the pyrite, it also combines with the sulfur to form sulfur dioxide. This is contacted with water converted into acid, part of which is to be used by Montecatini and part to be sold.

The impure iron oxide left in the roasting furnaces is then agglomerated for metallurgical uses. Heat generated by the reactions in the roasting furnaces will be used to produce steam for a steam power plant having a capacity of 60 million kw./year.

Antiknock: The day of the single all-purpose antiknock compound is over, said W. W. Sabin and C. J. Wolf



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ENGINEERING

of Ethyl Corp. (New York) at the recent Western Petroleum Refiners Assn. meeting in San Antonio, Tex. While tetraethyl lead continues to offer broadest over-all application, specific refining situations often can best use tetramethyl lead, equilibrium mixtures of lead alkyls, or various physical mixtures of TEL and TML in gasoline blending stocks. New antiknock discoveries and the variety of cars to be supplied-from high-performance, automatic - transmission models to compact cars and foreign models with manual shift-have contributed to the end of dependence on a single material.

Foam Metal Recovery: A foaming process to separate metals from solutions has been devised by Radiations Applications, Inc. (Long Island City, New York). In this Foamet process, a gas is boiled through the metal-containing solution. Certain components of the solution adhere to the bubbles and they are skimmed off the top. Similar to flotation processes used to concentrate mineral ores, the innovation here is primarily in equipment design.

Wafer Polisher: Dilute potassium hydroxide or hydrofluoric acid are the key chemicals in a process developed by Bell Telephone Labs for electrochemical polishing of semiconductor wafers. This method is faster and more efficient, claims Bell, and is expected to reduce present polishing costs more than 50%. Conventionally, semiconductor wafers are made in a four-step process: (1) sawing from crystal, (2) lapping (rough grinding) with coarse abrasive, (3) polishing by optical grinding techniques, (4) etching to remove final mechanical roughness. Electropolishing bypasses the second and third steps, furnishes the etching step with a wafer that is much easier to process.

Concrete Crucibles: Sodium silicate solution (14%), crude sodium fluorosilicate (1.0%), magnesite (25%), fireclay sand (23%), and fire-clay aggregate (37%) form a new refractory concrete used in the U.S.S.R. for aluminum melting crucibles. Developed by the Soviet Academy of Building and Architecture, the refractory concrete is said to have a longer life and a shorter drying time.



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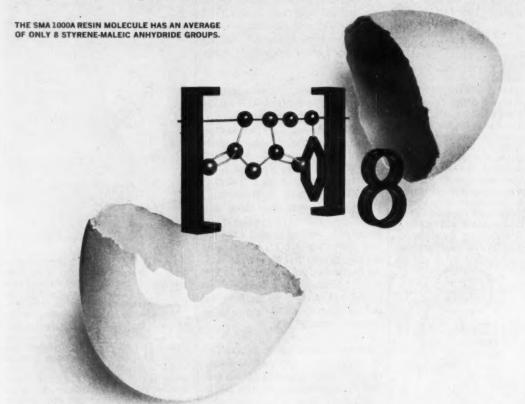
But, have you considered using an "individualized" shellac . . . tailored to improve the performance characteristics of your product? Leading shellac users call on skilled Mantrose researchers to build brand new advantages and predictable processing characteristics into the natural product. Why not try a shellac that meets your exact specifications? Just call or write for a consultation.



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CW PHOTOS-JOAN SYDLOW

New York businesspaper editors view telecast of new plant debut.

Plant Meets the Press-on Video

In New York last week Hercules Powder Co. conducted a closed-circuit TV tour of its new Lake Charles, La., polypropylene plant. Here's what went on backstage.

Hercules dimmed the lights at its New York ad agency last week, gave the business press a closed-circuit TV (CCTV) look at its new, 60-million-lbs./year Lake Charles, La., poly-propylene plant. Billed as a quick, inexpensive, safe way to cover a plant dedication, the show also raised the question, "Are on-the-scene plant tours going out of style?"

The answer has more than casual importance to CPI public relations directors who stage plant and laboratory visits. CPI construction cost will top \$3.5 billion in '60-61, with more than 1,000 projects involved. Publicizing such projects can be costly and difficult for the companies concerned. Example: American Smelting & Refining spent \$30,000 to fly in reporters from several countries to attend the opening of its new, \$36-million asbestos mine at Lake Asbestos, Que.

Fuller & Smith & Ross (the Hercules agency) Vice-President Ed Mahoney thinks CCTV is certain to find increasing use as a substitute for inperson tours, particularly where plants are distant from urban centers. Chief reason: the low cost of CCTV vs. the relatively high expense of arranging first-hand visits by reporters. While Mahoney won't say what the Hercules program cost (probably under \$10,000), he feels that the outlay was "considerably less" than the prospective tab to transport Hercules' 78 New York guests to Lake Charles, and pay their hotel and meal expenses for two or three days.

what It Costs: Companies now spend more than \$7 million annually for CCTV to handle sales meetings, etc., usually because it saves money on travel and hotels. CCTV program costs vary widely, depending on the user's needs and the distances involved. Basic cost (exclusive of outside talent, such as a celebrity, on the program) for CCTV to 10 cities may total \$18-25,000. Forty-eight cities coast-to-coast can be linked for \$76-96,000. Rental of the necessary telephone lines, alone, costs \$1-2/mile/-



Highlights of Hercules CCTV Program



Microwave bowl picks up Lake Charles broadcast from Empire State Building, feeds it to amplifiers.

hour. (Hercules rented 2,000 miles of line, used a rented transistorized microwave bowl to pick up the broadcast from the top of the Empire State Building. The signal was preamplified, then fed into FRS facilities for amplification, shading, etc., and presentation over twelve 21-in. TV sets at the agency.)

Speed and Security: Invitations to the broadcast queried, 'How about covering a Louisiana plant opening in mid-Manhattan? It can be done during your lunch hour."

Reporters saw Governor Davis of Louisiana and Albert E. Forster, Hercules president, dedicate the plant.

In addition, Hercules Vice-President Elmer Hinner and associates gave a live demonstration of polypropylene fiber, plastic and film applications. A personal tour of the new plant would have required about three days, including travel. Mahoney points out that the taped and filmed segments of the broadcast (including an aerial view of the plant) gave observers a



Reporters watch dedication on advertising agency television sets.

SILGORY Studies in Silicones HOW THESE TIME-TESTED MATERIALS CAN WORK FOR YOU

Silicones a Brilliant Success in Specialties -Polishes Are a Shining Example!

In the past fifteen years hundreds of chemical products have gotten a lift from silicones. And now they are playing a large part in the aerosol revolution. If you are interested in aerosols (and in making sales), you might get some notions here. We'll take polishes as an example.

POLISHED PERFORMANCE

Basically, silicone fluids upgrade car polishes for these reasons: They're incompatible with most organics, including wax crystals to which they impart lubrication. This makes buffing to a high luster easier. Being insoluble in fat and oils, they enable cleaner-polishers to reduce adhesion of surface grime. Their well-known water repellence helps protect surfaces against water-borne stains. Oxidation resistance makes them very long lasting. And since they undergo minimum viscosity change with temperature variation, they are easy to apply at all temperatures.

There are, of course, problems to be met. One is the effect of emulsifiers on gloss and appearance. For aerosol furniture polishes a substantive emulsifier is best-one that preferentially deposits oil on the surface to be polished. In general, this means cationic emulsifiers, or selected non-ionic ones. The latter are preferred because they give better emulsion stability. Union Carbide Silicone Emulsions are, of course, made with non-ionic emulsifiers-and are the most stable silicone emulsions made.

There are other considerations too: wax/silicone balance, selection of waxes, solvents, secondary emulsifiers, and propellants. We've got research facilities in all of these, and we'll discuss them in future issues (or see your Silicones Man now and discuss them personally).

AEROSOL FOAM FURNITURE POLISH

Aerosol formulations, long a specialty of UNION CARBIDE'S Silicones Division, consist basically of silicone, wax, an emulsifier, and either isobutane or Ucon

brand fluorinated hydrocarbon as a propellant. Here is a typical formula for an aerosol foam furniture polish that is easy to use and gives a lasting luster:

FORMULA 343A

	% By Weight
UNION CARBIDE L-45 Silicone Oil 350 cstks	. 3.0
"Crown" 23 Wax	2.0
Oleic Acid	2.0
Triethanolamine	1.0
Mineral Spirits	20.0
2% Aqueous "Carbopol" 934 Solution	10.0
Water	59.3
Triethanolamine Lauryl Sulfate	2.3
Non-ionic Alkylolamide ("Hyonic" FA-40)	0.4
	100.0
UCON Propellant 12: 18.5 weight per cent on polish	based
Can Pressure : 35-40 psi	
Valve: Clayton Standard Flow Foam Type	

Each of these ingredients has a purposethe triethanolamine lauryl sulfate, for instance, is both a foam stabilizer and a



UNION CARBIDE'S vast facilities and experience in chemicals are behind every step in development of silicone formulations to match your needs. Here, a scientist in the aerosol development laboratory tests a newly packaged formulation.

detergent. Detailed data are available on all of these, and on mixing, emulsifying and other important operations.

A VAST FUND OF INFORMATION

Studies carried out by UNION CARBIDE'S Silicones Division have been broad in scope and have resulted in many formulas for polishes of all kinds. In addition to its own research and development, the division has also drawn on the vast resources of the parent company and its related divisions for added technological and chemical information.

If polishes are your concern-or problem-by all means see your Union Car-BIDE Silicones Man. Remember, too, he is also an expert in hundreds of other uses of silicones in chemical processing and products. Whatever your needs in silicones, he can fill them. Use the coupon below.



Union Carbide and Ucon are registered trade marks of Union Carbide Corporation.

Silicones Divisio Union Carbide C Dept. DG-4104	Corporation	17 N V
270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Ltd. Bakelite Division, Toronto 12.		
Please send me	data on	
Name		
Name		
TITLE		



Participants in TV tour partake of buffet; event took place at lunchtime.

thorough look at the plant in only a fraction of the time normally required. And potential safety hazards present in any plant tour were avoided. This controlled tour also precluded inspection of areas that might give clues to Hercules polypropylene process.

Au Contraire: Mahoney's enthusiasm over the outlook for CCTV plant dedications (he predicts a sharply increasing number of these in the '60s) isn't shared by some CPI public relations directors. Their consensus: "If a plant is worth dedication ceremonies at all, it's worth having press people on the site."

Some new plants, the feeling goes, aren't sufficiently unusual to justify a formal dedication — so the plant launching is announced merely by a press release. When the occasion warrants dedication ceremonies, some experts believe that broader press cover-

age results from a personal tour by reporters. ASARCO's public relations director, Jackson How, thinks that CCTV is satisfactory for "a fairly static operation such as a chemical plant," feels that it would have been inadequate for the Quebec opening.

Case History: Besides the few key Hercules personnel and Governor Davis, the Lake Charles plant opening was attended by about 100 state, regional and local government officials. Only local newspaper and radio reporters covered the event first-hand. The two TV stations in Lake Charles showed a tape of the ceremonies on the evening of the New York telecast.

On the day prior to the dedication, the Lake Charles American Press carried a front-page column announcing the event. The next day it offered a secondary story on the front page with pictures of Governor Davis and the top Hercules executives present. Also the paper devoted six full pages in a "Hercules Plant Section" to the new plant, Hercules officials, the firm's history, products, etc., "welcome" ads from other Lake Charles CPI companies, and a full-page ad from Hercules saying "We're just as proud to be here."

Some of the wire services picked up three- or four-paragraph stories, in each case mentioning the CCTV beamed "back East." So the local coverage, limited mainly to Louisiana, was good. But few if any Texas newspapers ran the story. And national coverage is expected to be confined largely to the business press.

On the other hand, when Humble Oil opened its Baytown, Tex., polypropylene plant last year (CW, May 21, '60, p, 83), it flew in reporters from various parts of the country. The result in this instance was broad press coverage. Dow Chemical chose to open its Torrance, Calif., polypropylene plant with only limited press attendance. Dow's plans are different for the phenol plant it's building in Kalama, Wash. The governor of the state will be present and so will the press at a formal dedication.

The public relations director of another major chemical company says he would not use CCTV unless it could do a better job of showing the plant. If security regulations are too stringent to permit personal inspection, he would prefer issuing a routine release to using CCTV.

Room for Both: New York publicist W. Alec Jordan, whose firm (W. Alec Jordan Associates) has handled numerous CPI laboratory and plant openings, calls the use of CCTV "imaginative," a novel procedure that has its purpose and undoubtedly conserves the time of reporters. He explains, however, that advantages of the conducted press tour include the opportunity for members of the press to see things first-hand, appraise them directly, and get a broad perspective of the entire operation. This way the writers can develop their own stories. often with an individual news peg. It is often impossible-despite the presence of experienced public relations personnel - to anticipate everything that might interest a reporter. (For example, the newsman might angle his story from the standpoint of a novel pipe-coding scheme he discovers is being used in the plant.) Besides forming vivid impressions about the story being covered, these writers also get a chance to meet plant management, may glean ideas for future stories.

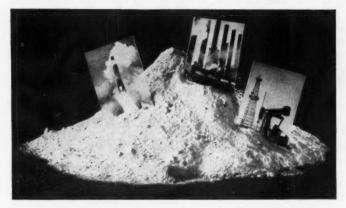
CCTV Boom: FRS, one of several ad agencies with CCTV facilities, recently installed them (at a stated cost of \$250,000) for a variety of client uses-including sales meetings, stockholders meetings, new product introduction, etc. It is also equipped to produce CCTV programs by writing the script, hiring essential personnel, and coordinating all phases of televising the production. The Hercules project was the first plant dedication handled by FRS. Kenyon & Eckhardt has just finished installing CCTV equipment. J. Walter Thompson boasts one of the most elaborate CCTV setups, including color TV equipment.

Companies such as TelePrompter Corp. (New York) offer the most elaborate CCTV coverage, although it is somewhat more expensive than the ad agency CCTV. TelePrompter Vice-President Edward C. Reveaux points out that his firm specializes in large-screen TV projection, which offers greater detail than the small sets. Reveaux concedes that there's often no substitute for the personal plant tour, but he anticipates steady growth of CCTV if, for no other reason, it can reach areas where it's impractical to provide adequate coverage. As more plants are built in remote spots, their inaccessibility may insure demand for this type of plant unveiling.



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Virtually every industry uses surfactants in a variety of ways in its products and processing. Until now, no surfactant could give the desired results in many application areas.

For example, with conventional surfactants it is practically impossible to form stable foams in strong acids, bases, oxidizing and reducing agents . . . and to maintain stability in the face of attack.

Now, a remarkable family of surface-active fluorochemicals -3M Brand Surfactants—is revolutionizing surfactant thinking. These new surfactants combine a stable fluorocarbon tail of extremely low surface energy, with a solubilizing

group that can be organic or inorganic, water-soluble and/or oil-soluble. The fluorocarbon tail makes possible exceptional stability-resistance to thermal, chemical, electrical, biological and radiation attack. And with the lowest surface energy of any known surfactant.

They readily reduce interfacial tensions even in systems that would destroy conventional surfactants . . . and at extremely low concentrations.

3M Surfactants are available as waxlike solids, free-flowing powders, or liquids. For more information, see the "profile" column to the right; then fill out and send us the coupon below...

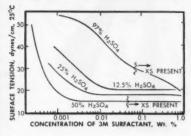
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Chemical and Thermal Stability. Exceptional stability in the presence of heat, strong acids and bases, oxidizing and reducing agents can be built into 3M Surfactants. In some cases they resist temperatures of 700° F. Strong acids: some 3M Surfactants can be refluxed for 48 hours in 50% H₂SO₄ with no evidence of decomposition or change in surface tension. Bases: 3M Surfactants have been used in 50% Sodium Hydroxide at 150° F. Oxidizing agents: There are 3M Surfactants that withstand 90% Hydrogen Peroxide. Reducing agents: tests show no damage to certain 3M Surfactants even when used in 95% Hydrazine.

Surface Activity. The extremely low surface energy of the fluorocarbon chain of a 3M Surfactant allows attainment of surface tensions of less than 18 dynes/cm. . . . at least 10 dynes per cm. lower surface tension than any other surfactant.



And the unprecedentedly low concentrations avoid many of the bad side-effects that arise when working with conventional surfactants. (See diagram above.) (H₂SO₄)

3M Surfactants reduce interfacial tensions easily . even between acids and organic liquids that defy conventional surfactants. In actual test, the interfacial tension between 50% H2O2 and OIL has been lowered to less than 1 dyne per cm. by the addition of only 0.05% by weight of 3M Surfactant to the peroxide phase.

Excellent leveling action without moisture sensitivity is possible in paints, waxes, coating materials of many types, because 3M Surfactants reduce surface tensions at very low concentrations. In the matter of foaming power they offer a distinct advantage by being able to form stable foams in liquids such as strong acids, bases, oxidizing and reducing agents which destroy conventional organic surfactants. They effectively produce stable emulsions of small particle size.

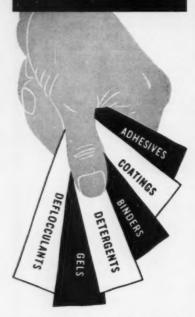
Concentration Requirements. 3M Surfactants function at much lower concentration than conventional surfactants. For example, .001% by weight of a 3M Surfactant will reduce the surface tension of water to 30 dynes per cm. It would take .1% by weight of a typical Alkyl Benzene Sulfonate to do the same job!

CHEMICAL DIVISION

MINNESOTA MINING AND MANUFACTURING COMPA

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Unique physical and chemical properties of PQ silicates find use in dozens of industrial processes. (Over 50 liquid silicate products, 25 dry forms from which to select the right one). You too, may benefit from a PQ silicate in at least one of your operations to improve the result or to reduce cost. Here are a few suggestions of the many ways in which industry applies PQ silicates:

DETERGENTS: Excellent soil removers in general cleaning, also metal working, laundry, special equip-ment. For mild to heavy duty cleaning.

ADHESIVES: Sodium silicates are ideal for combining paper, fiber board, cellulose and asbestos. Strong, rigid, fireproof bond; low cost; ready to use.

COAGULANT AID: For clarifying raw and waste waters. Improves water quality; increases filter runs. For more information, samples, prices, contact PQ Silicate Headquarters.



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ADMINISTRATION

Job Hunters' Parley?

A new attack on the use of technical meetings for recruiting purposes was launched last week via an open letter written by Van M. Evans, executive vice-president of Deutsch & Shea, Inc., a New York advertising firm.

Evans sent the letter to 13 scientific and engineering societies (e.g., American Chemical Society, American Institute of Chemical Engineers), called for a halt to all recruiting at conventions.

He says companies are becoming reluctant to send technical people to meetings when there is a distinct prospect of losing them, that many companies recruit at conventions only on a "defensive" basis and would welcome the ban.

Evans hits at organizations that concentrate recruiting activities in areas near meetings but "beyond the jurisdiction" of the societies involved.

One firm that specializes in this field defends its role as employer-job candidate matchmaker on the grounds that both parties benefit from the service. William Douglass, president of Careers, Inc. (New York), tells CHEM-ICAL WEEK: "We offer an opportunity to get the recruiting job done in a dignified, businesslike fashion." His company sets up centers at major technical meetings, where job applicants fill out a one-page form giving background, interests and salary range. The applicant is given a code number (to keep his identity secret). This number is posted on a bulletin board when a company is interested in seeing him.

LABOR

Agreements: A 49-day strike at Allied Chemical's Plastics & Coal Chemicals Division (Buffalo, N.Y.) ended when the first of 115 production and maintenance employees returned to their jobs. The settlement, ratified by OCAW Local 15-618, calls for immediate wage increases of 11-16¢/hour and a raise of 8¢/hour effective Feb. 8, '62. Other settlement provisions call for full company payment of Blue Cross and Blue Shield insurance, a new pension plan, providing retirement benefits, and retention of seniority for 24 months after layoff, and inclusion of Washington's Birthday as an additional paid holiday.

OCAW Parleys: Delegates from oil bargaining units of OCAW are holding a series of area bargaining policy meetings this month in Kansas City, Salt Lake City, Dallas, Chicago, and Washington. Object is to sound out members on wage and other targets for the next nationwide oil bargaining program. No nationwide drive for another wage increase is expected until late '61 at the earliest. At each area meeting, two members will be elected to OCAW's National Bargaining Policy Committee for Oil, which will meet later this year, probably in Denver.

KEY CHANGES

C. M. (Pat) Barnes to president, The Dayton Tire & Rubber Co. (Akron, O.), subsidiary of The Firestone Tire & Rubber Co.

Daniel H. Schultz to president, Leeds & Northrup, Canada, Ltd.

Richard M. Link to the board of directors, General Controls Co. (Glendale, Calif.).

Homer S. Myers to executive vicepresident, Tracerlab-Keleket (Waltham, Mass.).

L. A. Miller to vice-president marketing, Central Scientific Co. (Chicago).

Joseph N. Kuzmick to vice-president, Raybestos - Manhattan,

Leonard W. Steiger, Jr., to assistant to the president, Chemical Products Division, Chemetron Corp. (Chicago).

Bruce Walker to general manager, Electro Minerals Division of The Carborundum Co. (Niagara Falls, N.Y.).

R. L. Boyer to vice-president of advanced planning, The Cooper-Bessemer Corp. (Mount Vernon, O.).

C. Glen Bigelow, Jr., to vice-president research, Selas Corp. of America (Dresher, Pa.).

Alexander E. Lawson, Jr., to vicepresident, The Gow-Mac Instrument Co. (Madison, N.J.), manufacturer of gas analysis instrumentation and thermal conductivity cells.

Stanley S. Anders to treasurer, Taylor Fibre Co. (Norristown, Pa.).

Norman B. Champ., Jr., to vicepresident, Crane Co. (New York).

LET'S KEEP

Business Help For Our Colleges Going Full Speed Ahead

"Should our company fold up its program of financial help for higher education now that the Kennedy Administration plans to have the federal government provide this kind of help in a big way?" It is clear why, in the light of campaign promises and plans announced since, this question is being raised in many business firms at this juncture.

What seems far clearer, however, is the right answer to the question. It is a resounding NO! This is no time for the business community to ease up in what have been its notably successful efforts to help our colleges and universities get out of the deep financial hole in which they are operating. On the contrary, this is the time to put more steam than ever behind the drive of business to increase its financial help for higher education.

Massive Help Needed

It is easy to understand why any individual businessman or firm might have a rather despairing feeling about the prospect of competing with the federal government, with its almost all-embracing tax arm, in providing financial support for higher education or almost anything else for that matter. But this is not a case of competition. It is a case where our colleges and universities must have massive help all along the line if they are to be put squarely back on their feet financially—a goal of crucial and perhaps decisive national importance. The business community will continue to have both the opportunity and the obligation to keep on increasing its help for higher education as rapidly as possible.

To underline this proposition take a look at the chart at the top of the next page. It shows how far the salaries of college and university faculty members continue to lag behind those of other occupational groups in the U.S.A. There has been some relative improvement in the average of faculty salaries in recent years. And the salary improvement in some fields, such as those of science and mathematics, has been very pronounced. But the chart makes clear how badly the average salary of college and university faculty members still lags.

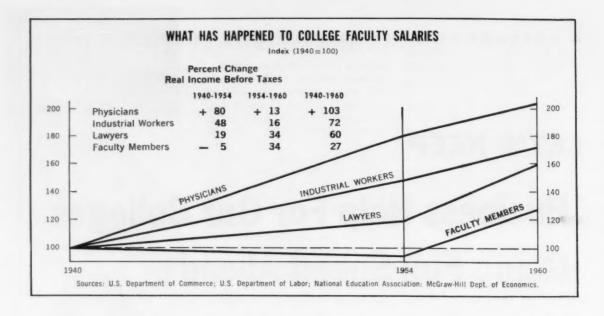
No Federal Funds For Salaries

The plans for increased financial aid for higher education, proposed by President Kennedy, do not contemplate increased expenditure for faculty salaries. This, we believe, is wise whether or not you feel, as many do, that resort to this kind of federal financing would inevitably carry with it federal controls that would ultimately undermine academic independence. The fight over federal appropriations for faculty salaries would be so long and bitter that it would be destructive to the aid program as a whole.

However, what the federal government will not be doing to remedy the deplorable condition of faculty salaries, as reported by the chart, is one indication of the tremendous scope that remains for crucially important help for higher education from business. Manifold other indications are available.

Disaster Escape Route

One of these indications is provided by the careful calculation that the annual income of our colleges and universities must be increased by about \$4½ billion (from about \$4½ billion to about \$9 billion) over the next eight years if the tremendous wave of students



now gathering to descend on these institutions is not to wind up in both a financial and an educational disaster. This wave promises to add more than 2.5 million, or 75%, to college enrollments by 1970.

Thus far, the program for financial help for higher education by business, spearheaded by the Council for Financial Aid to Education, has been a remarkable success in all dimensions. The dollars contributed have increased rapidly—from about \$100 million five years ago to about \$150 million this year. Contributions of \$500 million a year by 1970 are a clear possibility.

One of the inspiring developments increasing this possibility stems out of Cleveland, Ohio. There through their chief executives, an imposing group of business firms have established one per cent of their profits before taxes as their minimum goal for contributions to higher education, to be reached within three years. General acceptance of this goal by business would go most of the way toward getting our colleges and universities firmly on their feet financially.

Mutual Respect Increased

The mutual esteem of the academic community and the business community, an element of enormous importance to a free society, has been increased by the manner in which the program of financial aid has been carried out. In making its contribution, there has been no attempt whatsoever on the part of business to encroach upon the academic freedom of the institutions financially benefited. And the program of financial aid has greatly increased the knowledge, understanding and respect which the colleges and universities and business have for each other.

The Kennedy Administration's program to enlarge federal financial support of higher education is certain to arouse strenuous controversy. As proposed by its Task Force, it avoids some of the most controverial areas of principle, However, the very magnitude of the proposed extension of the federal government's already vast program of financing higher education involves fighting issues.

But if the enlargement of federal aid were to be deeply discouraging to the continued expansion of private aid for higher education, it would be a national misfortune of major proportions. There is no good reason why it should be. On the contrary, there is compelling reason for the business community to continue giving higher education all the financial help it possibly can, thus speeding onward a program that has been and continues to be a major constructive force for our colleges and universities, for business and for the nation.

This message was prepared by my staff associates as part of our company-wide effort to report on major new developments in American business and industry. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or part of the text.

Donald McGraw

McGRAW-HILL PUBLISHING COMPANY



Your Next Package Can Benefit From Polyethylene's Dramatic Sales Power!

The point of sale becomes your product's strongest sales tool when you package in an IMCO polyethylene container. Polyethylene allows almost endless variations in form and color and gives package designers a freedom they aren't allowed with conventional materials.

IMCO's experienced engineers can produce almost anything your designers can conceive. Mennen's new "Brake" package is a spectacular example. Presented a creative design, IMCO supplied the engineering to develop the vision into a reality. IMCO production facilities mold and decorate all elements of this unusual five-part package except the applicator and an interior rubber grommet.

It's high time you discover what IMCO polyethylene containers can do for your product. Prices are now directly competitive with glass and tin. Chemical improvements have made polyethylene impermeable to most things, even perfumed cosmetics, creams and household products. Our technical staff can assist you with tests, and quote prices on stock or custom-made bottles and jars. For immediate action, contact the Sales office nearest you.



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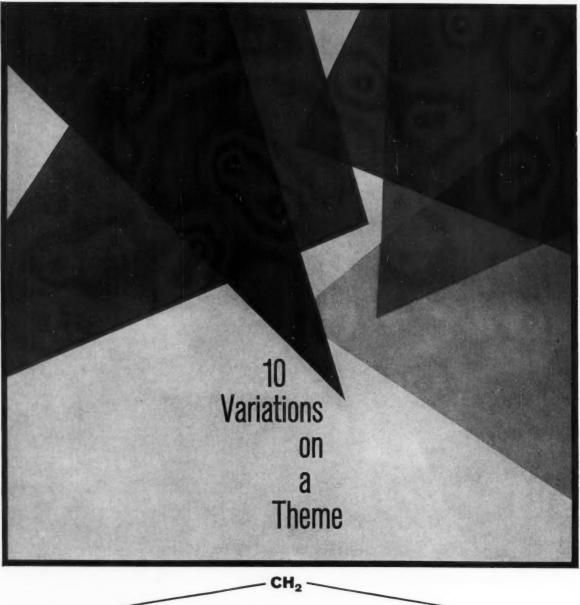
cooksville, Ont., Can.

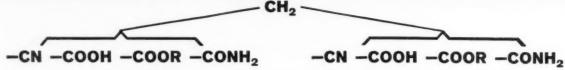
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Harrisonburg, Va.

IMCO SELLS THE BEST





There are ten possible compounds represented by the formula above, assuming that R is ethyl. Seven of them (plus two where R is methyl) are Kay-Fries products.* Replacing one hydrogen on the methylene group with another substituent gives 10 more. Replacing the other hydrogen gives another 10 and so it goes on and on. The possible variations are staggering in number. Their importance of course lies in what they will do — Products derived from this original group of active methylene compounds now supplement your diet, cure your ailments, put you to sleep or wake you up, make paint, clean metal, stick things together, and so on. What new applications may be developed from this highly versatile group only the future can tell. Certainly the opportunity should be inviting in your research program. We will supply samples and technical information to the best of our ability. Write us.

*Cyanoacetic acid, Cyanoacetamide, Ethyl cyanoacetate, Methyl Cyanoacetate, Malonic Acid, Diethyl Malonate, Dimethyl Malonate, Malonamide, Malonanitrile,



KAY-FRIES CHEMICALS, INC. 180 MADISON AVE., N.Y. 16, N.Y. MU 6-0661

Market Newsletter

CHEMICAL WEEK April 22, 1961 Is Du Pont's slash of synthetic fiber prices the second salvo of an all-out battle for synthetic fiber markets? There were even bigger reductions last fall by Beaunit Mills, and Du Pont's action last week tends to support the argument that marketing pressure will ultimately force synthetic fibers into low-price, commodity-status levels (CW Special Report, April 15, p. 69).

Although the new cuts are a step in that direction, full commodity status for synthetic fibers probably won't be reached for several years.

Du Pont explains its 7-17¢/lb. cuts on Dacron polyester fibers and 4-15¢/lb. cuts on nylon as moves to broaden markets. That's another way of saying that it is ready for a battle against other producers busily pushing for increased output of these synthetics.

Some trade observers believe that the Du Pont move was catalyzed at this time by price cuts on Dacron-cotton broadcloths by Klopman Mills—an act that threw Du Pont's other Dacron customers into a competitive turmoil.

Du Pont's competitors, taken by surprise, pondered possible countermoves over the week-end, then started tacking up competitive price reductions on their own polyester fibers.

Du Pont's cut of polyester fiber prices doesn't set a new low, instead represents a partial, belated answer to Beaunit Mills' slashes. Beaunit's drastic move reduced Vycron tabs on 3-denier and 1½-denier fibers to \$1/lb. Du Pont's lowest price for Dacron polyester is now \$1.14/lb. for 1½ denier and \$1.24/lb. for other deniers.

AviSun's new, 100-million-lbs./year polypropylene plant at New Castle, Del., is scheduled for startup July 15. The firm's other PP plant, at Port Reading, N.J.—originally rated at 20 million lbs.—now has a capacity of 25 million lbs./year, AviSun says.

AviSun's 125-million-lbs./year total capacity will make the firm the biggest potential producer in the business. But AviSun hasn't necessarily won permanent distinction as the polypropylene leader; other producers pushing for increased capacity will make it a hot race for some time.

The British are facing rougher competitive problems, as is evidenced by earnings reports of leading pharmaceutical firms.

For example, Glaxo Laboratories Ltd., in an interim account of last-half '60, reported that profits were down 4% from '60—despite a 3% increase in value of sales. The decline is attributed to "highly competitive conditions, particularly in export markets." The situation is expected to continue.

Market Newsletter

(Continued)

British Drug Houses Ltd. also reported a drop—of almost 7% in its '60 trading profits—but gave no specific reason for the decline. The organization's profit in '60 was \$1.79 million, compared with \$1.92 million in '59; net profit after taxes and interest fell 20%, to \$716,800.

U.S. firms selling butadiene should start dickering with Polymer Corp. (Sarina, Ont.). The firm is having second thoughts about developing wholly Canadian sources to fill its increasing butadiene requirements, now sees "economic sense" in piping butadiene across the border from the U.S., where supply is long and prices have declined.

Polymer has been obtaining butadiene from various sources for current operations; at the same time it is upping its own butadiene capacity from 150 million lbs. to an estimated 170 million lbs./year. But when Polymer's new, 20,000-tons/year polybutadiene unit is completed next year, it will create a need for an additional 45-50 million lbs./year of butadiene, and U.S. companies are a likely source.

U.S. synthetic rubber business in general is off almost 30%, says a rubber industry spokesman who, nonetheless, sees hope of an upturn in the near future.

The "real" problem in styrene-butadiene rubber, he says, is pinned to styrene monomer price, which—in the face of incrasing capacity—is now "close to rock bottom" (current quote: 10.99¢/lb.).

The situation is getting more tense all the time. Prices can't move down much more, and most producers are trying hard to figure out a way to boost them. But there are two obstacles: overcapacity and the ever-present threat that styrene buyers will go basic.

The price of tall oil rosin is cut from 13.75¢ to \$12.15¢/lb. (in drums) by Arizona Chemical in a move aimed at improving "stability and clarity of the rosin price picture."

The action further reflects the unsettled rosin situation that recently prompted American Turpentine Farmers Assn.'s request for members to place all rosin output into the '61 Commodity Credit Corp. loan—unless a price of at least $11.5 \phi/lb$. can be obtained at processing plants.

SELECTED PRICE CHANGES-WEEK ENDING APRIL 17, 1961

UP	Change	New Price
Stearic acid, dbl., pressed, bgs. Tin, metal, Straits	\$0.0075 0.04	\$0.18 1.09
Coumarin, NF, cryst., dms.	\$0.30	\$3.00
Carnauba wax, No. 2, refd., pure, ton lots	0.04	0.76
Ouricury wax, crude, bgs	0.02	0.50
All sales are nound unless suggested to succeed		

All prices per pound unless quantity is quoted.



in the shuffle

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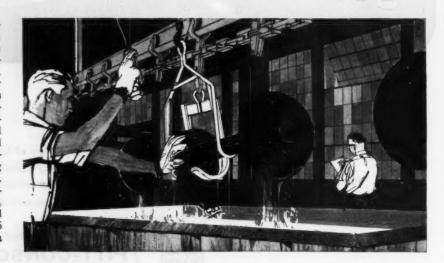


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Armour Industrial Chemical Company has done much of the basic research and development with cationic emulsifiers. The following are typical applications.

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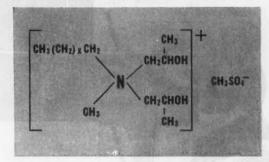


SURFACE MAINTENANCE. Cationics such as Ethomeen T/12 and Armac® T chemicals produce oil and wax emulsions of a fine-particle size that rapidly exhaust onto fibers, glass, masonry, metals and plastics. When dust mops, for example, are immersed into a cationic emulsion, the oil exhausts completely from the emulsion onto the strands of the mop. Furthermore, cationic emulsifiable concentrates are easily prepared for water dilution by the ultimate user.

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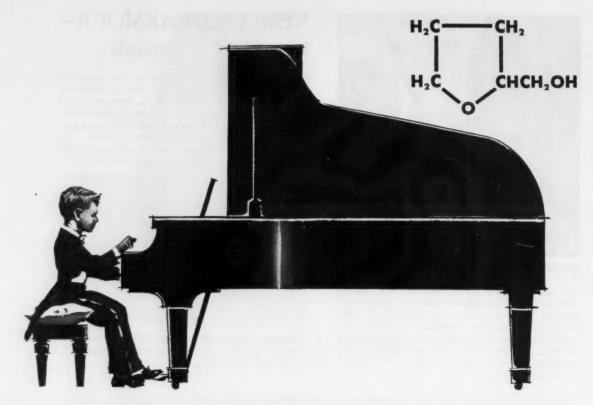
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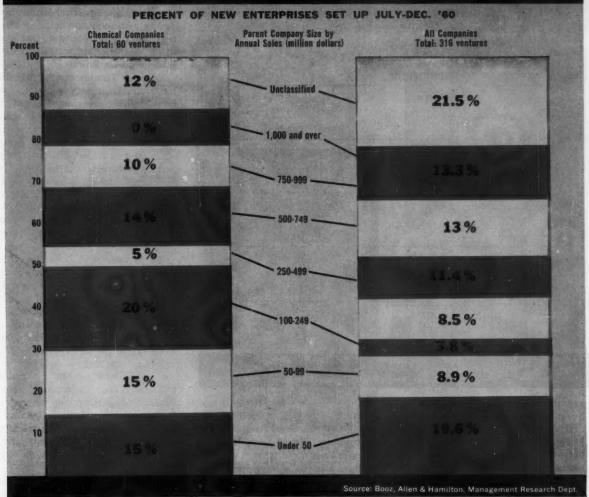
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Foreign Investment - Not for the Big Alone



How to Win in Overseas Business

More and more smaller chemical companies are finding ways to get in on the overseas investment boom. Here are the experiences of several such firms now operating successfully on foreign shores.

Smaller chemical process companies are looking harder than ever for a chance to expand their domestic operations into foreign ventures. A recently completed survey of new U.S. overseas projects during last-half '60 shows that more than 25% of the new operations were offsprings of American companies with less than \$50 million in annual sales.

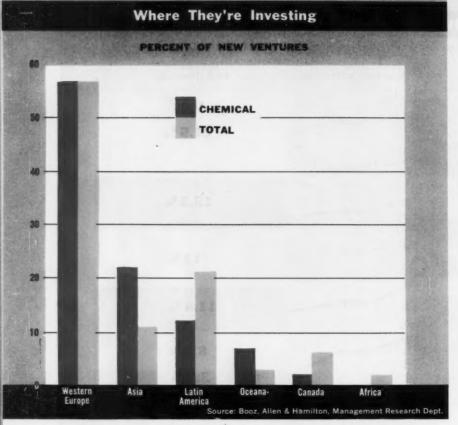
Booz, Allen & Hamilton, Chicagobased management consultant, made the study, examined 316 overseas ventures—new plants and acquisitions of existing units—of 233 U.S. companies. Period covered by the study: July-Dec., '60.

The chemical industry led all others in the search for foreign markets, accounting for 19% (60 projects) of the total activity. And a healthy 15% of chemical projects were launched by firms with sales of less than \$50-million/year. Moreover, Booz, Allen points out that many international operations covered by the study were established by companies for which sales data are not available. Most of

these are smaller companies.

In terms of total investment, the CPI giants obviously far outstrip their smaller counterparts. But it is now also clear that relatively small size doesn't prevent a company from "going international."

The smaller CPI firms are represented in all segments of overseas chemical investment. Geographically, Western Europe was most popular among U.S. firms expanding overseas; the Common Market and the European Free Trade Assn. received 57%



of the new ventures. Asia drew the next-largest share — 22% — Japan taking most of this. The rest was split among Latin America (12%), Oceania (7%), Canada (2%).

In Tandem: Joint ventures are about the most popular of all methods used by smaller CPI firms to gain entry into foreign production. But the specifics of these deals vary widely.

Ansul Chemical Co. (Marinette, Wis.) with a Mexican operation, and Metal & Thermit (New York) in Mexico and Europe, illustrate how two companies did it. For Ansul, moving into foreign production was simply a matter of survival, according to Robert C. Hood, president of the \$11-million/year producer of fire extinguishers, fire-fighting chemicals, arsenicals and specialty organics. If Ansul is not successful on an international basis within 10 years, he says, its business future "is highly questionable." Domestic growth, he adds, is simply not sufficient to offset competitors' overseas benefits.

He cites Ansul's Mexican operation. Its major Mexican customer had been buying Ansul's U.S.-made equipment through distributors, wanted to shift to local suppliers. To keep this market, Ansul had to go into Mexican pro-

duction. Result: an investment of \$200,000-300,000 in a small factory, which now assembles and fills fire extinguishers shipped from the U.S.

Ansul has a majority interest in this venture, lined up a local group with capital and connections as its partner.

Metal & Thermit, producer of a highly diversified line of basic chemicals, racked up sales of more than \$40 million in '60. Its venture into Mexico was less defensive than Ansul's.

Originally, M&T exported ceramic materials through a native sales representative, who convinced M&T that local production could mean bigger sales and profits. In '59 M&T formed a joint venture with its former salesman, now backed by a group of other Mexican businessmen, to build a ceramic opacifier plant. Like Ansul, M&T holds majority—51%—interest and intends to distribute its product to the expanding local market.

Both companies have followed some of the same principles and have come to pretty much the same conclusions on the mechanics of overseas joint ventures.

One point of special importance to a small firm: contact with a local group, one with financially sound connections and the political acumen for dealing with sometimes intricate local laws. These groups have a good idea of the market, often are first to suggest the joint venture.

Metal & Thermit combed Mexico for businessmen with experience in ceramics. The company wanted a fresh entry, rather than an established concern already competing.

Such a tie-in with a local group offers the easiest solution of marketing problems. When foreign nationals are partners, the language barrier is also overcome. Ansul's Hood points out that, although it's essential to have competent bilingual management people, they are hard to find in smaller local companies.

Big Brother: When a smaller U.S. company lunges into the hurly-burly of European competition, it's generally advisable that it take a local partner big enough to push its products.

M&T, for example, is now doing business with two major European producers — France's Rhone-Poulenc and England's Albright & Wilson — in contrast with its Mexican tie-up with individual businessmen. This means yielding controlling interest to the larger partner, of course, but overriding this is the chance to get into a major new market, which it probably couldn't crack without the big brother.

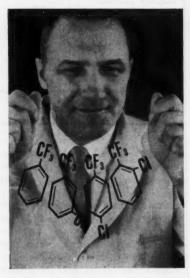
Regardless of location, Ansul's Hood says, the main problem for a small company going abroad is marketing. Ansul uses an unusual source of information to augment its commercial intelligence: a professional anthropologist, hired to evaluate local cultures, sociological patterns and attitude toward business. Hood feels that this advice definitely eased the path for the Mexican venture.

A big stumbling block stands in the way of a small company that wants to go abroad if it has a limited, specialized product line: the line may be too sophisticated for many foreign countries. For example, Metal & Thermit's organometallics find no market in many large areas. On the other hand, CPI concerns with broader production can reach all levels of industrial development.

Investment in Time: Setting up a foreign operation is generally an elaborate, time-consuming process. For a small company without a large international staff, it means that top

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How U.S. Firms Participate in Foreign Ventures

	Number of Units
Joint venture	126
Wholly owned subsidiary	111
Majority financial interest	25
Foreign branch	21
Minority financial interest	18
Unknown financial interest	15
Total	316

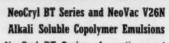
management must spend a lot of time away from normal duties. This usually entails a number of overseas trips by the company's president.

Ansul's Hood maintains that this is actually a good thing, that foreign concerns expect top-level attention and feel slighted if they must deal with lower-echelon executives. Too many top executives make the mistake of avoiding this direct participation.

Metal & Thermit has found that wrapping up an agreement in most cases takes longer than the several weeks a top executive can stay abroad. To solve this, M&T and its prospective partners come to an "agreement in principle," carry on the rest of the negotiations through the mail. Final signing of contracts take place anywhere.

Metal & Thermit and Ansul both caution that insufficient partnersearching can lead to trouble. A small firm often limits its choice of partner to a few foreign concerns, fails to make a thorough canvass for the best possible arrangement.

Rust-Oleum (Evanston, Ill.), manufacturer of rust-protective coatings (annual sales of \$18-20 million), offers a good case history of a relatively small firm's success abroad. R-O's President Robert Ferguson last spring launched an extensive marketing campaign in Western Europe, hoping to double in one year the company's \$750,000 in foreign sales throughout 60 countries. His object: to capitalize on the Common Market and EFTA. By building a coating plant in Hol-



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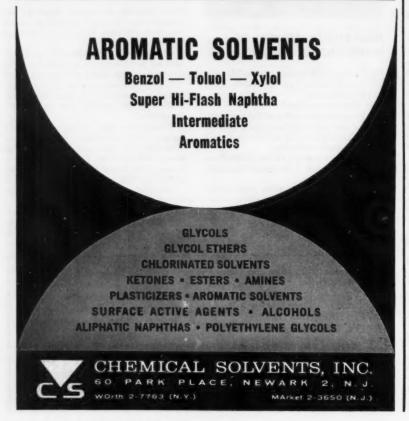
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INTERNATIONAL

land, Rust-Oleum shortened delivery time from weeks to days, shaved transportation costs considerably. Like M&T and Ansul, R-O uses foreign nationals as sales representatives. They back up local jobbers, give technical service, go after certain accounts. English representatives in the U.K., French in France. Austria and Switzerland, and Greek in Greece, the Mideast and North Africa are coordinated through an R-O official sent to Europe as the firm's top sales executive.

Intensive advertising — carried out in several foreign languages — and marketing techniques that include demonstrations, technical service recommendations and better packaging have helped give Rust-Oleum a chance to catch up to the established, but more conservative, European councerns.

The whole venture, R-O's Ferguson feels, shows the necessity of having strong distributors, a conclusion he shares with Metal & Thermit and Ansul management. Where strong distributors operate, Rust-Oleum sales have been good; where they have been absent, sales have been only fair, sometimes poor, as in France, where the "type of distribution" R-O wants has yet to be found.

On the other side of the world, in Australia, another American CPI firm, Emery Industries (Cincinnati, O.), with '60 sales of \$32 million, is starting the third year of selling and distributing its Sanitone, a drycleaning process, to Australian drycleaners. Australian interest in Emery's product was sparked by two developments: Sanitone's success in neighboring New Zealand, where it had been popular for several years, and the relatively backward state of the Australian drycleaning business.

Drycleaners deal directly with Emery Industries of Australia, agree to take a package consisting of the Sanitone detergent and process directions. Emery in turn supplies engineering service and a guarantee of better results if Sanitone is used properly. Last year, as a result of Emery's first extensive sales campaign, the number of drycleaners taking the package shot up from five to 80. The attraction, Emery says, is its better process, bolstered by effective marketing.

Emery's experience in Australia

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INTERNATIONAL

points up how tariff barriers can affect a company's plans. Because there was a potential Sanitone market, Emery decided to build a local detergent plant to avoid the import restrictions. But soon afterward the restrictions were dropped, and Emery switched its plans—it set up a sales and distribution company selling Sanitone detergent imported from the company's U.S. facilities.

Whitmoyer Laboratories (Myerstown, Pa.), producer of animal health products and veterinary pharmaceuticals (sales of about \$6 million in '60), ran into the same problem of tariffs when it tried to break into the British market.

Result: after a number of personal trips to the U.K., President Whitmoyer bought controlling interest in Reed, Ltd., a British chemical concern, now sees an expanding market for Whitmoyer-Reed's line in the poultry industry. Whitmoyer feels that location in England means a central position for exporting to the Commonwealth countries and the EFTA, of which the U.K. is an important member.

In every instance, these companies say they are more than satisfied with their foreign operations. Metal & Thermit has several other ventures "on the fire"; Rust-Oleum expects to continue expansion of overseas sales; Ansul is looking at possibilities in England, Belgium, Japan; and Whitmoyer sees more markets on the European continent.

M&T is particularly interested, as are most of the others, in joint ventures. The reason is simple: although joint ventures mean more of a financial risk, the profits can be far greater than the guaranteed-but limitedreturn from licensing agreements. In expanding overseas, M&T finds that most often it takes the initiative of suggesting new markets to possible foreign partners. Only occasionally, as in Mexico, is this situation reversed. But in any case, M&T officials feel, no company will accomplish anything unless top management is internationally minded and is willing to become directly involved.

"Know-how," represented by the specific new product, is obviously the most exportable item that the relatively small CPI firm has to offer. But this in itself obviously does not guarantee success.

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- Chicage 11 Alfred D. Becker, Jr., R. J. Claussen, 520 N Michigan Ave., MOhawk 4-5800
- Cleveland 13 ... H. J. Sweger, Duncan C. Stephens 1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000

- Frankfurt/Main Stanley Kimes, Westendstrasse 85, Germany
- Geneva Michael R. Zeynel 2 Place du Port, Geneva, Switz.
- W-724 Prudential Bldg., JAckson 6-1281
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- Pittsburgh 22 Duncan C. Stephens, 4 Gateway Center, EXpress 1-1314
- Portland 4 Scott B. Hubbard Room 445, Pacific Bldg.
- San Francisco 4 William C. Woolston 255 California St., Douglas 2-4600

116 CHEMICAL WEEK April 22, 1961

FOREIGN ROUNDUP

Refractories/Argentina: Kaiser Aluminum & Chemical has licensed Ceramica Olivos S.A. (Buenos Aires) to produce and sell its line of basic refractories and fire-clay specialty products. Along with supplying technical servicing and trademarks, Kaiser will ship from California seawater periclase, principal ingredient in making basic refractories mixes.

Paint/Curacao: The Antillian Paint Factory has started operations at Willemstad, Curacao. The plant, owned by Dutch and local interests, will have a yearly output valued at 1.6 million Antillian guilders (about \$3 million) expandable to 3 million guilders worth. Plans call for eventual export to other Caribbean territories and South America.

Polyurethane Yarn/Italy: Italy's Pirelli will produce polyurethane elastic yarn (Vairin) under license from U.S. Rubber. Output will be aimed at the lightweight-fabrics market.

Chemicals/South Vietnam: South Vietnam will build its first chemical center at An-Hoa, 360 miles northeast of Saigon and six miles from the Nong-Son coal mines. First plant to be installed is a 50-60,000-tons/year synthetic urea plant, followed by a 6-10,000-tons/year calcium cyanamide plant and, later, a pulp and rayon plant that will use bamboo as raw material. The government is seeking West German credit for the urea plant.

Asbestos/Nigeria: A \$1.86-million, 25,000-tons/year asbestos products plant has started commercial production at Ikeja, on the outskirts of Lagos. It's owned by Asbestos Cement Products Nigeria Ltd., a joint venture of the Western Nigeria Development Corp. and private interests. This will be the first plant of its type in Nigeria.

Iron Ore, Sulfuric Acid/Italy: Montecatini will build at Follonica a plant to produce 170,000 metric tons/year of iron ore and 350,000 tons/year of sulfuric acid.

It will be the first run for Montecatini's process for extracting ferrous minerals from pyrite. Onstream target: June '62. ADDRESS BOX NO. REPLIES TO:
BOX NO.
Classified Adv. Div. of this Publication
Send to Office nearest you
P.O. Box 12, New York 36, N. Y.
320 N. Michigan Ave. Chicago 11, III.
255 California St., San Francisco 11, Calif.

POSITIONS VACANT

Sales Manager-Vinyl Resin-Experienced in the sale of polyvinylchloride polymers and copolymers to converter industries. Must also have background in the sale of insulation compounds to electrical industry. Plant located in the East-Northeast. Liberal salary and benefits. Our employees are aware of this advertisement. P-6453. Chemical Week.

Pharmacoutical Chemist-To assume charge of manufacturing, formulation, development of oral Ethical Drugs, Compensation based on experience and training includes excellent salary, insurance, stock options, profit sharing, opportunity to enter Executive Management. All replies Confidential. Submit resume, salary requirements: President, Medics Pharmaceutical Corp., 203 Rio Circle, Atlanta (Decatur), Ga.

Career Opportunity 1. techn. chemical salesman f. Chi. ago area and radius of 250 miles, w. following in chemical, cosmetic, paint, cleaning compound and allied industries. Quick financial owth sossible f. man with ambition and initiat. e. Well establ. Eastern manufacturer, known from the complete confidential resume w. initial income requirements to Mona Industries, Inc., Paterson 17, N. J.

Sales Trainees-Chemical seles cureers for young men with chemical degrees and freedom to relocute, Minimum I year training at headquarters. Choice of several U.S. cities. Send comple e resume Personnel Dett., Geigy Industrial Chemiculs, Division Geigy Chemical Corp., Saw Mill River Rd., Ardsley, N. Y.

SELLING OPPORTUNITY AVAILABLE

Manufacturer of novel homogenizing-mixing equipment, full line, highly efficient, requires regional representation by established ag-nts of chem. process equipment. Protected territories. Reply, giving background, equipment handled, region desired. RW 6527, Chemical Week.

Solesmon: Adhesives, Contings, Seolents, tor Industrial, Government, and Construction applications. Wide range of products. Well established company with advertising program. Several territories open. Write to Mr. Martin Tishler, The Magichemical Company, Brockton, Massachusetts.

Monufacturers Agents-Monufacturer of Internationally acclaimed Kady Dispersion Mills and Kadyzolver Mixers will add to present representation. Many attractive areas open. Write stating lines now handled and territory covered. Kinetic Dispersion Corporation, 95 Botsford Place, Buffalo 16, New York.

3 Year Old Growing Co. needs industriel "Reps." calling on engineers, architects & contractors; Choose locale. Top quality Epoxy, Polysulphide compounds. Prefer Chemical background. Terrific opportunity. Send resume; confidential—RW-6584, Chemical Week.

POSITIONS WANTED

Foreign executive assignment desired by Ph.D., with European experience, Strong background in development, production and technical service vinyl polymers. Two years management small company. Good business sense, Consultant for domestic & foreign concerns. Languages. PW-6496, Chemical Week.

Chemical Sales-Cincinnati Base; 8 yrs experience sales, Phosphates, Phos. Acid, Fatty Acids, Nitrogen; No Degree, Prefer Basic Mfr; Write PO Box 103, Cin'ti 1, Ohio.

BUSINESS OPPORTUNITIES

Chemical Process Plants for sale as Jecus-North Little Rock, Arkansas. Nitric Acid Synthesis Plant, 18,000 lb./day design capacity. Nitric Acid Concentrating Plant, 160,000 lb./day design capacity. Sulphuric Acid Concentrating & Recovery Plant, 52,392 tons/year capacity. Pictor Acid & Ammonium Picrate Plants, (9) identical units, oal capacity 18,500 lb./day picric acid, 180,000 lb./day ammonium picrate. Power Plant, (5) water-tube boilers, 4620 sq. ft. 300 PSI, each 34,500 lb. steam per hour, gas fired with oil stand by. For sale or lease on location. Completely developed plant site with all utilities. Midwest location. Perry, 1415 N. 6th St., Phila. 22, Ps.

Long-established Brazilian, expanding and profitable manufacturing company of industrial chemicals and pharmaccuticals Specialists, without an attention of distribution, wishes to associate with one or two substantial American copporations interested in Brazilian operations, Form of association matter of negotiation and can be based on minority or majority stock interest or merger. Annual sales over \$2,000,000 with act value including real property, plant, etc. in excess of this figure. Excellent references. Chief executive of Brazilian company will be in New York last week in April for personal discussions. If interested, please write BO-6590, Chemical Week, indicating availability for meeting with chief executive.

PLANTS & PROPERTIES

Now building for chemical or paint plant for sale-20,000 sq, ft. on five acres of land or moretheavy industrial area, rail and all utilities. 15 minutes from midtown New York City in New Jersey or will build to order and rent to AA-1 company. FS-6461. Chemical Week.

FOUIPMENT FOR SALE

Allis-Chalmers 5' by 5' ball mill, manganese liners, balls, scoop feeder, 75 HP motor & drive. Perry, 1515 N. 6th St., Phila. 22, Pa.

465 gal 7304L Stainless reactor, 150# internal WP, 165# jacket WP. Perry, 1415 N. 6th St., Phila. 22, Pa.

Davenport 8' x 60' rotary dryer, 7/16" welded, complete, late model, must be moved. Perry, 1415 N. 6th St., Phila. 22, Pa.

1800 gal. 7316 Stoinless jacketed reactor, Vacuum internal, new jacket. Perry, 1415 N. 6th St., Phila. 22, Pa.

Raymond 6-roller, 66" dia. putverizing mill, 200 HP, whizzers avail., Perry, 1415 N. 6th St., Phila. 22, Pa.

Tanks for Sale-Due to expansion of our facilities we have four 3200 gallon tanks at \$30.00 and six 1200 gallon tanks at \$150.00 for sale. Farnow, Inc., 4-83 48th Avenue, Long Island City 1, NY, Stillwell 6-1144.

Solvent Vapor Recovery System-10,000 gal. stainless clad adsorbers, etc. 26,000# activated carbon; Buflo-Vac Stainless Drum Dryer 42" dia. x 120" long, w/cast iron drums, speed 2 to 8 RPM; 2 Ball Mill Shells 6" x 6', jacketed, \$600 ea.; Copper Fractionating Column, condensers. Process Equipment Sales Corp., 4205 Fullerton, Detroit 38, Mich.

Liquidation:—3 Complete Breweries Being Sold.
Over 200 glass, lastiglas and mammut lined
tanks-2000 to 31,000 gal. available. Write for
free listing-Brewers & Bottlers Equipment Corp.,
105 Shields Street, West Hartford, Conn.

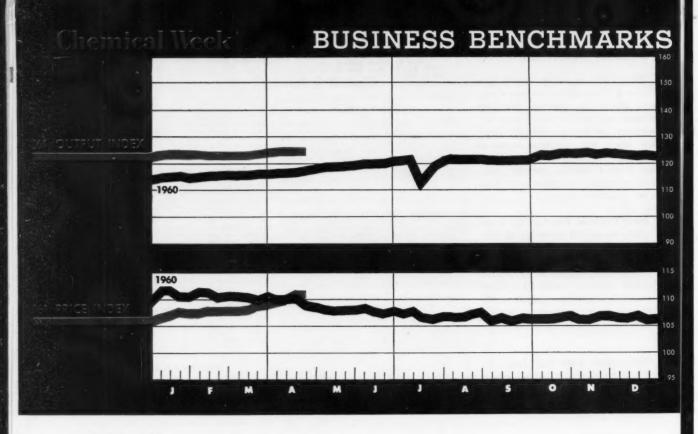
Liquid coustic sode set-up. 7,500 gal. tank, insulated, with steam coil and boiler. Griffin Chemical Co., 528 Franklin St., Louisville 2, Ky.

CHEMICALS FOR SALE

Chemical Grade Iron Powder -20 Mesh. Large tonnage available. Contact: Robert Craig, Micro Metals Corp., 99 President St. Passaic, N.J. PRescott 8-6689.

CHEMICALS WANTED

Surplus Wanted Chemicals, Pharmacouticals, Oils, Acids, Plasticizers, Resins, Dyes, Solvents, Figments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N.Y. HAnover 2-6970.



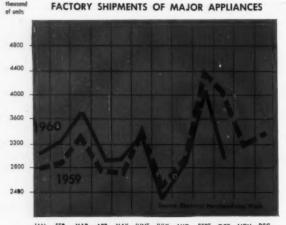
APRIL 22, 1961

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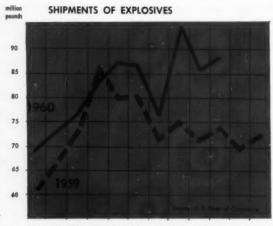
WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	126.0	125.9	119.9
Chemical Week wholesale price index (1947=100)	112.5	112.3	109.9
Stock price index (12 firms, Standard & Poor's)	51.74	51.16	52.66
Steel ingot output (thousand tons)	1,696	1,632	2,417
Electric power (million kilowatt-hours)	14,182	14,163	13,852
Crude oil and condensate (daily av., thousand bbls.)	7,227	7,352	7,028

FOREIGN TRADE INDICATORS (Thousand dollars)	Latest Month	EXPORTS Preceding Month	Year Ago	Latest Month	IMPORTS Preceding Month	Year Ago
Chemicals, total	121.3	140.1	132.7	27.4	29.8	24.4
Coal-tar products	11.4	14.7	11.8	5.0	8.0	4.7
Industrial chemicals	19.0	24.1	26.7	8.1	10.5	9.4
Medicinals and pharmaceuticals	21.9	22.8	22.0	2.7	1.9	2.0
Fertilizers and materials	7.1	9.8	7.7	9.8	6.7	6.7
Vegetable oils and fat (inedible)	10.0	14.5	8.5	5.5	6.3	6.0

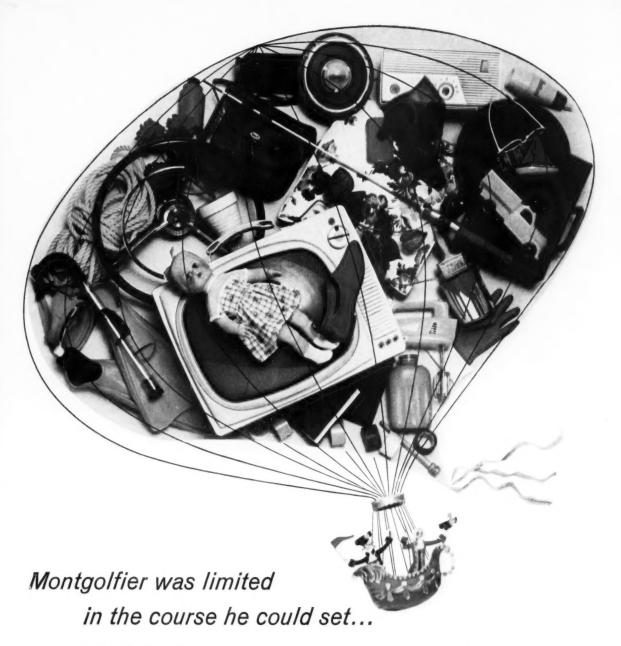
CHEMICAL CUSTOMERS CLOSE-UP_



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The inventor of the first fire balloon couldn't control his direction. But with Sinclair petrochemicals, you can set a sure course toward the development of new and profitable products.

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a great number of additional products and applications. You benefit in other ways, too because the quality of Sinclair petrochemicals has *always* been *above* customers' specifications. What's more, Sinclair production schedules are set up to assure you of product supplies when and as you need them.

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PARAXYLENE (98%) • PROPYLENE (99+%) • DURENE (1.2.4.5 TETRAMETHYLBENZENE) • ANHYDROUS AMMONIA • AMMONIUM NITRATE SOLUTIONS • ACUA AMMONIA • NITROGEN FERTILIZER SOLUTIONS • ALIPHATIC SOLVENTS • ODORLESS SOLVENTS • AROMATIC SOLVENTS • HEAVY AROMATIC SOLVENT TOLUENE (NITRATION GRADE) • XYLENE (FIVE DEGREE) • SULFUR • SULFONATES (OIL SOLUBLE) • CORROSION INHIBITORS • LUBE OIL ADDITIVES



ANOTHER CHEMICAL PROCESS ACHIEVEMENT FROM SD

Scientific Design Boosts Phthalic Anhydride Yield from Ortho-Xylene

Now Scientific Design Company offers a new improved convertible catalyst which produces phthalic anhydride from ortho-xylene at yields comparable to those obtainable from naphthalene. Here's what this means to the chemical producer:

1 An immediate raw material cost saving due to ortho-xylene's present lower price and predicted even lower future price;

2 Lower capital cost of plant;

3 Completely flexible plant operation, permitting production of phthalic anhydride in high yields from naphthalene, ortho-xylene, or any combination of the two;

4 No reduction in plant productivity, regardless of feedstock

employed.

This higher yield results in greatly reduced contaminating by-products and thus provides an extra bonus of unexcelled purity of phthalic anhydride product.

SD's unique process for phthalic anhydride from ortho-xylene will be used in the plant now under construction for Compagnie Française des Matieres Colorantes in France.

SCIENTIFIC DESIGN COMPANY, INC.

EXECUTIVE OFFICES: TWO PARK AVENUE, NEW YORK 16, NEW YORK

International Leaders in the Development, Design and Construction of Chemical Plants

